

Authority: FOOTPRINTS FOR LEARNING SOCIETY
School: FOOTPRINTS FOR LEARNING CHARTER ACADEMY

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HOLISTIC AUTHENTIC PURPOSE DRIVEN ENTREPRENEURIAL GLOBAL

SCIENCE GR 1-9 PROGRAMMING

CURRICULUM PHILOSOPHY (ALBERTA EDUCATION):

Science is the study of many interconnected disciplines, including physics, chemistry, biology, Earth science, astronomy, and computer science. Science is creative, collaborative, and dynamic; is based on experience and evidence; and employs objective methods for observing, collecting, and analyzing data. Scientific knowledge is developed, refined, and extended as new evidence is uncovered. The study of science allows students to nurture curiosity, ask and answer questions, explore scientific and technological concepts, and acquire knowledge and understanding of the world.

Science provides a reliable basis for decision making and is essential in developing innovative ideas and solutions. It includes the critical-thinking skills, scientific knowledge, and civic literacy required to respond to relevant personal, societal, and environmental issues. Students develop critical reasoning and scientific literacy through exploring science concepts and applying scientific methods. Scientific knowledge is enriched through the shared contributions of people from diverse cultures and perspectives. Science and technology are deeply interwoven in our daily lives. Together, they enable society to build and share knowledge, innovate, improve quality of life, and predict future events.

The Science curriculum engages students in active investigation to build scientific knowledge and develop critical-thinking and problem-solving skills. Students deepen knowledge and understanding through collaborative conversation, recording and analyzing data, and interpreting scientific texts, including diagrams, models, or digital simulations. Students will have opportunities to describe natural phenomena, create science projects, and evaluate information about science-related issues.

Topic Organization:

- Students deepen their understanding of the physical world through investigating matter and energy. They develop understanding of properties of materials and the structure of matter, and they investigate movement, light and sound, forces, and energy resources.
- Exploring interconnections between natural phenomena allows students to deepen their understanding of Earth systems, living systems, and space. Investigating these natural systems allows students to develop a deeper understanding of the natural world, consider the impact of their actions, and recognize the responsibility we share for environmental stewardship and sustainability.
- Exploring Earth systems provides students with opportunities to investigate the surrounding environment, landforms, interdependent systems of Earth, climate, and climate change. In living systems, students investigate plants and animals from a variety of perspectives. Students will gain

knowledge of various classification systems for organisms, investigate functions of external structures and internal biological systems, and begin to develop an understanding of ecosystems. Students will also investigate a variety of astronomical phenomena and components of the solar system.

- The study of computer science allows students to apply creativity, design, and computational thinking and to develop scientific inquiry and problem-solving skills. Students will employ design processes in the creation of instructions, algorithms, and computational artifacts. They will also engage in coding activities and consider the impacts of computers, coding, and technology.
- The study of scientific methods allows students to develop discipline-specific skills, such as investigation, collection of data, analysis of evidence, and development of hypotheses and scientific explanations. Students will have opportunities to integrate these skills into all other areas of the Science curriculum.
- Student engagement in science can be enhanced by providing opportunities for active learning through experimentation, field experiences, and land-based approaches to science. Learning about Francophone, First Nations, Métis, Inuit, and worldwide contributions to science helps all students gain a better understanding of the diversity of the scientific community and the collaborative and dynamic nature of science.
- The Science curriculum provides solid foundations in scientific methods and knowledge of the physical, living, and digital world. As students become scientifically literate, they learn to apply their knowledge, communicate their thoughts, and evaluate ideas to make informed decisions. Scientifically literate citizens are equipped to evaluate sources of information encountered in daily life. They responsibly pursue a wide variety of scientific and technological interests, studies, or career options in areas such as engineering and design, technology, medicine, manufacturing, agriculture, robotics, social sciences, and the space industry in ways that can continue to make life better.

NEW PROGRAMS OF STUDY (ALBERTA EDUCATION):

Kindergarten and Grade 1

<https://curriculum.learnalberta.ca/curriculum/en/c/scik>

<https://curriculum.learnalberta.ca/curriculum/en/c/sci1>

Grade 2 and Grade 3

<https://curriculum.learnalberta.ca/curriculum/en/c/sci2>

<https://curriculum.learnalberta.ca/curriculum/en/c/sci3>

Grade 4 and Grade 5

<https://curriculum.learnalberta.ca/curriculum/en/c/sci4>

<https://curriculum.learnalberta.ca/curriculum/en/c/sci5>

Grade 6

<https://curriculum.learnalberta.ca/curriculum/en/c/sci6>

GRADES 1, 2, AND 3 - SCIENCE

Topic Outline:

A. Matter: Understandings of the physical world are deepened by investigating matter and energy.

B. Energy: Understandings of the physical world are deepened by investigating matter and energy.

C. Earth Systems: Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.

D. Living Systems: Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.

E. Computer Science: Problem solving and scientific inquiry are developed through the knowledgeable application of creativity, design, and computational thinking.

F. Scientific Methods: Investigation of the physical world is enhanced through the use of scientific methods that attempt to remove human biases and increase objectivity.

Note: Some topics can be addressed across a number of units as embedded elements - (E) and (F)

Timeline:

| REPORTING TERM | MONTHS | TOPIC |
|----------------|----------------------|---|
| I | September - November | G1 - AB G2 - AB G3 - AB (E and F throughout) |
| II | December - March | G1 - CD G2 - CD G3 - CD |

| | | |
|-----|--------------|------------------------|
| | | (E and F throughout) |
| III | April - June | Project Based Learning |

Process and Required Materials:

- *Student Textbooks* - There is no current designated student textbook by Alberta Education. Reference resources will be gathered by PLC's.
- *Student Project Portfolio (Graded Activities- for assessment)*: There is no current student workbook. Reference resources will be compiled by PLC's.
- Student Literacy Books: These are optional readings on the topics covered in Science for the Student, Parent, and Teacher.
- *Science Fair Project Package*: This is an online pdf file and Google site for the students and teachers to follow as a formative and summative bonus task for the year.
- *Science Research Project Package*: This is an online pdf file and Google site for the students and teachers to follow as a formative and summative differentiated task for the year.

Assessment Weighting:

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|--|-----|
| Assignment Booklets: (Formative) | 60% |
| Science Fair Project (Formative and Summative) | 10% |
| Science Class Projects (Formative and Summative) | 30% |

- Student Formative work should apply the UDL approach with Alberta Education Core Competencies and Program of Study Outcomes to build student skill sets with continuous feedback for continuous growth.
- Inclusion of Entrepreneurship and FNMI elements is required.

GRADES 4, 5, AND 6 - SCIENCE

General Topic Outline:

Grade 4, 5, 6

A. Matter: Understandings of the physical world are deepened by investigating matter and energy.

B. Energy: Understandings of the physical world are deepened by investigating matter and energy.

C. Earth Systems: Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.

D. Living Systems: Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.

E. Computer Science: Problem solving and scientific inquiry are developed through the knowledgeable application of creativity, design, and computational thinking.

F. Scientific Methods: Investigation of the physical world is enhanced through the use of scientific methods that attempt to remove human biases and increase objectivity.

Note: Some topics can be addressed across a number of units as embedded elements - (E) and (F)

Timeline:

| REPORTING TERM | MONTHS | TOPIC |
|----------------|----------------------|---|
| I | September - November | G4 - AB G5 - AB G6 - AB (E and F throughout) |
| II | December - March | G4 - CD G5 - CD G6 - CD (E and F throughout) |
| III | April - June | Project Based Learning Revision/Exam Preparation for PAT |

Process and Required Materials:

- Course Outline
- Unit Plans
- Student Unit Booklets
- Backwards by Design Lesson Plans
- Google Classrooms

Required Books/Supplies:

- Student Textbooks (paper and digital): Students will have access to textbooks, if available, however, with the curriculum in transition, digital resources will need to be compiled for student reference.
- Student Assignment Book: These Unit Booklets have key information and questions for student learning. Unit summaries are also included.
- Student Project Portfolio (Graded Activities- for assessment): These tasks focus on researching, exploring, and applying lab activities to text learning.
- Mid Term & Final Exam Review Packages (for assessment): There is one midterm and a final test. Some students may require more than one period to complete their exam, extra time should be given to students based on their individual needs and abilities. Exams are done individually during class time and should be supervised.
- Science Fair Project Package: This is an online pdf file and Google site for the students and teachers to follow as a formative and summative bonus task for the year.
- Science Research Project Package: This is an online pdf file and Google site for the students and teachers to follow as a formative and summative differentiated task for the year.

Assessment Weighting:

Science 4, 5, and 6

| | |
|--------------------------------------|-------|
| Assignment Booklets: (Formative) | 30% * |
| Project/Lab Portfolios: (Formative): | 30% * |
| Tests: (Formative with Rewrites) | 25% * |
| Mid Term Exam: (Summative) | 5% |
| Final Exam: (Summative) | 10% |

Science Fair Project (Optional Bonus) 10%

Science Research (Optional Bonus) 10%

* Student Formative work should apply the UDL approach with Alberta Education Core Competencies and Program of Study Outcomes to build student skill sets with continuous feedback for continuous

growth.

* Entrepreneurship and FNMI elements are required for infusion into the learning program.

GRADES 7, 8, 9 - SCIENCE (Old Curriculum)

Philosophy - Alberta Program of Studies

Learning about science provides a framework for students to understand and interpret the world around them. Elementary and secondary science programs help prepare students for life in a rapidly changing world—a world of expanding knowledge and technology in which new challenges and opportunities continually arise. The decisions and actions of future citizens need to be based on an awareness and understanding of their world and on the ability to ask relevant questions, seek answers, define problems and find solutions.

IMPORTANT LINKS:

- <http://www.learnalberta.ca/content/mychildslearning/>
- <https://www.alberta.ca/programs-of-study.aspx#toc-1>
- https://education.alberta.ca/media/3576124/comp-in-science_20mar_17_final.pdf
- https://guides.library.ualberta.ca/teaching-science/elementary_resources
- <https://lor.adlc.ca/items/2774ab45-782d-4389-ad96-5221b62a7dd3/1/>
- <https://lor.adlc.ca/items/0151ddf6-7282-470b-bc4c-a676c2fc3dad/1/viewcontent/e501a1ae-ddb7-49da-a8e4-2d0809d067e0?sl.t=true>
- <https://lor.adlc.ca/items/8b836d5a-5fc4-435a-bc03-5dcb28ee2c35/1/viewcontent/e501a1ae-ddb7-49da-a8e4-2d0809d067e0?sl.t=true>
- https://www.adlc.ca/resources-teachers/supplementary_resources/preview-review/
- <http://www.learnalberta.ca/Search.aspx?lang=en&search=&grade=&subject=Science>
- https://www.mhschool.com/instructional_materials/ca/fwo.html •
- <http://www.edquest.ca/component/content/article/205>

The above links are not a complete set of resources and do not reflect a shift to a new Program of Study from the Alberta Government (yet to be modified and approved). However, they do present a core and scaffolded resource series that provides a starting point for creating the necessary student materials. The ADLC links are for a traditional and linear workbook and quiz series that comprehensively covers content and aligns directly to the approved Pearson and Nelson texts. There are additional elementary resources from the USA that have pending copyright approval and will be used where applicable in creating the student materials. Additional resources are stored in a FLCA Google Site.

Alberta Education Curricular/Outcome LINKS:

- PROGRAM OF STUDY - https://education.alberta.ca/media/3069389/pos_science_7_9.pdf
- CORE COMPETENCIES - <https://education.alberta.ca/media/3576124/comp-in>

Topic Outline:

Grade 7 - FOUNDATIONS IN STS/KNOWLEDGE/SKILLS/ATTITUDES for Science

- A. Interactions and Ecosystems
- B. Plants for Food and Fibre
- C. Heat and Temperature
- D. Structures and Forces
- E. Planet Earth

Grade 8 - FOUNDATIONS IN STS/KNOWLEDGE/SKILLS/ATTITUDES for Science

- A. Mix and Flow of Matter
- B. Cells and Systems
- C. Light and Optical Systems
- D. Mechanical Systems
- E. Freshwater and Saltwater Systems

Grade 9 - FOUNDATIONS IN STS/KNOWLEDGE/SKILLS/ATTITUDES for Science

- A. Biological Diversity
- B. Matter and Chemical Change
- C. Environmental Chemistry
- D. Electrical Principles and Technologies
- E. Space Exploration

Timeline:

| REPORTING TERM | MONTHS | TOPIC |
|----------------|----------------------|-------------------------------|
| I | September - November | G7 - AB G8 - AB G9 - AB |

| | | |
|-----|------------------|--|
| II | December - March | G1 - CD G2 - CD G3 - CD |
| III | April - June | G7/8 - E and Science Fair Project G9 - E and Revision/Exam Preparation for PAT and optional Science Fair Project |

Process and Required Materials:

- Course Outline
- Unit Plans
- Student Unit Booklets
- Backwards by Design Lesson Plans
- Google Classrooms

Required Books/Supplies:

- *Student Textbooks* (paper and digital): Students will have access to textbooks, if available, however, digital resources will need to be compiled for student reference and posted on Google Classrooms.
- *Student Assignment Book*: These Unit Booklets have key information and questions for student learning. Unit summaries are also included.
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- *Science Research Project Package*: This is an online pdf file and Google site for the students and teachers to follow as a formative and summative differentiated task for the year.

Assessment Weighting:

| | |
|----------------------------------|-------|
| Assignment Booklets: (Formative) | 30% * |
| Project Portfolios: (Formative): | 30% * |
| Tests: (Formative) | 20% * |
| Mid Term Exam: (Summative) | 10% |
| Final Exam: (Summative) | 10% |

- Student Formative work should apply a UDL approach with Alberta Education Core Competencies and Program of Study Outcomes to build student skill sets with continuous feedback for continuous growth.
- Entrepreneurship and FNMI infusion is required.

Science Fair Project (Optional Bonus) 10%

Science Research (Optional Bonus) 10%