About our Energy Efficiency and Climate Action Education Program – And its Correlations with the Alberta Curriculum

This program helps students build knowledge and competencies.

Knowledge:
- Electricity consumption – measuring electricity in kilowatt-hours $P = IV$ and $E = P \times t$, understanding the appliances/items that use electricity and categorize these by highest energy users to lowest energy users.
- The environmental impacts of electricity consumption – the amount of carbon dioxide produced when electricity is used.
- The financial impacts of electricity consumption – the costs associated with electricity usage.
- Energy efficiency/conservation – how to manage electricity usage through efficiency or conservation and the resulting reductions in energy usage, costs and carbon dioxide emissions.

Competencies:
- Collaboration – working together to analysis information, outline problems, and create solutions to reduce energy consumption.
- Creativity and Innovation – developing innovative and creative solutions to reduce electricity consumption, costs and carbon dioxide emissions.
- Critical thinking – using reasoning and analysis, synthesis to generate ideas and to challenge assumptions.
- Problem-solving – identify problems, evaluate alternatives to select strategies to reduce energy consumption.
- Managing Information – organizing and using information to generate reports to analysis and synthesize information.
- Communication – using the information and reports to communicate what they’ve learned and to outline their solutions for reducing energy consumption.
- Cultural and global citizenship – engaged in actions that develop their citizenship at the local level that contributes to global solutions.
## Science Curriculum Correlations

<table>
<thead>
<tr>
<th>Grade</th>
<th>Topic</th>
<th>Student learning outcomes</th>
</tr>
</thead>
</table>
| 5     | A: Electricity and Magnetism | 5-5 Demonstrate safe methods for the study of magnetism and electricity, identify methods for measurement and control, and apply techniques for evaluating magnetic and electrical properties of materials.  
- Recognize that the amount of electricity we use is measured in kilowatt hours.  
- Interpret and explain - the reading on an electrical meter, efficiency labels on electrical appliances |
| Grade 7 | Unit C: Heat and Temperature | 4. Analyze issues related to the selection and use of thermal technologies, and explain decisions in terms of advantages and disadvantages for sustainability  
- Compare the energy consumption of alternative technologies for heat production and use, and identify related questions and issues  
- Identify positive and negative consequences of energy use, and describe examples of energy conservation in their home and community. |
| Grade 8 | Unit D: Mechanical Systems | 4. Analyze the social and environmental contexts of science and technology, as they apply to the development of mechanical devices  
- evaluate the design and function of a mechanical device in relation to its efficiency and effectiveness, and identify its impacts on humans and the environment. |
| Grade 9 | Unit D: Electrical Principles and Technologies | 1. Investigate and interpret the use of devices to convert various forms of energy to electrical energy, and electrical energy to other forms of energy.  
2. Describe technologies for transfer and control of electrical energy.  
   a. Assess the potential danger of electrical devices, by referring to the voltage and current rating (amperage) of the devices...  
   b. Measure voltages and amperages in circuits  
   c. Develop, test and troubleshoot circuit designs for a variety of specific purposes  
3. Identify and estimate energy inputs and outputs for example devices and systems, and evaluate the efficiency of energy conversions  
   a. Identify the forms of energy inputs and outputs in a device or system  
   b. Apply appropriate units, measures and devices in determining and describing quantities of energy transformed by an electrical device – P=IV, E=PxT  
   c. The concepts of conservation of energy and efficiency to the analysis of energy devices  
   d. Compare energy inputs and outputs of a device, and calculate its efficiency  
   e. Investigate and describe techniques for reducing waste of energy in common household devices  
4. Describe and discuss the societal and environmental implications of the use of electrical energy |
<table>
<thead>
<tr>
<th>Subject</th>
<th>Unit</th>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
</table>
| Science 10       | Unit B: Energy Flow in Technological Systems | Grade 10 | a. Describe the by-products of electrical generation and their impacts on the environment  
                   |                                           |         | b. Identify concerns regarding conservation of energy resources, and evaluate means for improving the sustainability of energy use |
| Science 24       | Unit B: Understanding Common Energy Conversion Systems | Grade 12 | 3. Apply the principles of energy conservation and thermodynamics to investigate, describe and predict efficiency of energy transformation in technological systems  
                   |                                           |         | a. Describe, qualitatively and in terms of thermodynamic laws, the energy transformations occurring in devices and systems  
                   |                                           |         | b. Describe how the first and second laws of thermodynamics have changed our understanding of energy conversions  
                   |                                           |         | c. Explain the need for efficient energy conversions to protect our environment and to make judicious use of natural resources |
| Physics 20       | Unit C: Circular Motion, Work and Energy   | Grade 11 | General Outcome 2 – Students will explain that work is a transfer of energy and that conservation of energy in an isolated system is a fundamental physical concept. |
| Science 30       | Unit D: Energy and the Environment         | Grade 12 | General Outcome 1 – Students will explain the need for balancing the growth in global energy demands with maintaining a viable biosphere. |
Social Studies Curriculum Correlations

| Grade 9 | 9.2 Issues for Canadians: Economic Systems in Canada and the US | 9.2.5 – Assess, critically the relationship between consumerism and quality of life in Canada and the US by exploring and reflecting upon the following questions and issues:  
• What are the indicators of quality of life?  
• How does individual consumer behaviour impact quality of life?  
• How does marketing impact consumerism?  
• How does consumerism provide opportunities for and limitations on impacting quality of life?  
• How is consumerism used as a power of a collective?  
• To what extent do perspectives regarding consumerism, economic growth and quality of life differ regionally in North America?  
• What societal values underlie social programs in Canada and the United States? |
| Grade 10 | Key Issue: To what extent should we embrace globalization? | • Explore multiple perspectives regarding the relationship among people, the land and globalization (stewardship, sustainability).  
• Evaluate actions and policies associated with globalization that impact the environment (environmental legislation).  
• Analyze multiple perspectives on sustainability and prosperity in a globalizing world. |

Career and Technology Foundations (Grades 5 to 9)

**CTS** has 14 learning outcomes that are same for grades 5 to 9. This curriculum supports programming decisions at the local level to ensure that **CTF** courses are responsive to the needs of students, teachers, schools and communities. **CTF** allows students to explore their interests, passions and skills while making personal connections to career possibilities.

- I explore my interests and passions while making personal connections to career possibilities.
- I use occupational area skills, knowledge and technologies.
- I follow safety requirements associated with occupational areas and related technologies.
- I demonstrate environmental stewardship associated with occupational areas.

**CTS** is planning, creating, appraising and communicating in response to challenges.

- I plan in response to challenges.
- I make decisions in response to challenges.
- I adapt to change and unexpected events.
- I solve problems in response to challenges.
- I create products, performances or services in response to challenges.
- I appraise the skills, knowledge and technologies used to respond to challenges.
- I communicate my learning.

**CTS** if working independently and with others while exploring careers and technology.

- I determine how my actions affect learning.
- I develop skills that support effective relationships.
- I collaborate to achieve common goals.
### Career and Technology Studies (Grades 10 to 12)
#### Natural Resources - Environmental Stewardship

| Introductory courses | ENS1020: Fostering Stewardship | 1. Identify trends in the consumption and use of resources and issues related to the effects of resource consumption and use on the environment and investigate possible solutions.  
3. Propose shared and personal actions that foster sustainable management of the environment. |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ENS1910: ENS Project A</td>
<td>Students develop project design and management skills through contexts that are personally relevant. Must connect with a minimum of two CTS courses, one of which must be at the introductory level and be in the same occupational area as the project course. The other CTS course can be either at the same level or at an intermediate level from any occupational area.</td>
</tr>
</tbody>
</table>
| Intermediate Courses | ENS2220: Energy Conservation Principles | 1. Explain basic principles of energy conservation and efficiency.  
2. Demonstrate applications of energy technologies in the residential, commercial or transportation sectors.  
3. Demonstrate basic competencies.  
4. Identify possible life roles related to the skills and content of this cluster. |
| | ENS2910: ENS Project B  
ENS2910: ENS Project C | Students develop project design and management skills through contexts that are personally relevant. Must connect with a minimum of two CTS courses, one of which must be at the intermediate level and be in the same occupational area as the project course. The other CTS course can be either at the any level from any occupational area. |
| | ENS2950: ENS Intermediate Practicum | Students apply prior learning and demonstrate the attitudes, skills and knowledge required by an external organization to achieve a credential/credentials or an articulation. Should only be accessed by students continuing to work toward attaining a recognized credential(s) or an articulation offered by an external organization. Cannot be part of RAP or the Green Certificate Program. |
| Advanced Courses | ENS3040: Energy & the Environment | 3. Plan and implement a group action campaign that fosters environmental awareness, energy conservation and energy efficiency; e.g. class, school, community |
| | ENS3220: Energy Conservation Applications | 1. Describe energy use within a residential or commercial environment or transportation sector.  
2. Design a residential or commercial structure or transportation technology that uses energy conservation and efficiency |
| | ENS3910: ENS Project D and ENS Project E | Students develop project design and management skills through contexts that are personally relevant. Must connect with a minimum of two CTS courses, one of which must be at the advanced level and be in the same occupational area as the |
project course. The other CTS course can be at least at the intermediate level from any occupational area.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENS3950: ENS Advanced Practicum</td>
<td>Students apply prior learning and demonstrate the attitudes, skills and knowledge required by an external organization to achieve a credential/credentials or an articulation. Should only be accessed by students continuing to work toward attaining a recognized credential(s) or an articulation offered by an external organization. Cannot be part of RAP or the Green Certificate Program.</td>
<td></td>
</tr>
</tbody>
</table>

Career and Technology Studies (Grades 10 to 12)
Business, Administration, Finance and Information Technology – Enterprise & Innovation

| Intermediate Courses | ENT2030: Financing Ventures | 1. Identify the advantages and disadvantages of financial options. 2. Describe various sources of financing for ventures. 3. Demonstrate the difference between short- and long-term financing. 4. Demonstrate the process of applying for different types of financing. 5. Demonstrate basic competencies. 6. Identify possible life roles related to the skills and content of this cluster. |

Special Projects 10-20-30

Special Projects credits are designed to recognize work undertaken by students on an individual or small group basis and should not be used as a means of offering credits for unapproved courses.

- Students become involved in the selection, planning and organization of their own programs.
- Students pursue activities in which they have considerable interest or ability but which are not within the scope of the regular curriculum or the programs being offered in the school.
- Credits may be granted for 75 hours – 3 credits; or 125 hours – 5 credits.

Math – Grades 7 to 9

| Numbers |
| Patterns and Relations |
| Statistics and Probability |

Math – Grades 10 to 12

| Relations and Functions |