

# Course Outline

**School Name:** Keewaytinook Internet High School

**Department Name:** Science

**Ministry of Education Course Title:** Science

**Grade Level:** 9

**Ministry Course Code:** SNC1L

**Teacher's Name:** 'Eli' K.A. Pivnick

**Developed by:** 'Eli' K.A. Pivnick

**Date:** October 2006

**Revision Date:** September 2009

**Developed from:** The Ontario Curriculum Grade 9 and 10 Science, 1999

**Profile Name:** Locally Developed Compulsory Credit Course, Course Profile, Science Grade 9, 2005

**Text:** Science Power 9, McGraw-Hill Ryerson, 1999

**Prerequisite:** none

**Credits:** 1

**Length:** 110 hours

**Principal's Name:** Darrin Potter

**Principal's Approval (signature)** \_\_\_\_\_

**Approval Date:**

## ***Course Description/rationale***

This course emphasizes reinforcing and strengthening science-related knowledge and skills, including scientific inquiry, critical thinking, and the relationship between science, society, and the environment, to prepare students for success in everyday life and the workplace. The students may proceed from this course to a Grade 9 Science Applied or Academic course, or a Grade 10 optional Locally Developed course as a stepping stone to the Science Grade11 Workplace course.

Students explore a range of topics, including science in daily life, properties of common materials, life-sustaining processes in simple and complex organisms, and electrical circuits.

Students have the opportunity to extend mathematical and scientific process skills and to continue to develop their skills in reading, writing and oral language through relevant and practical scientific activities.

## ***Overall Curriculum Expectations***

### **Scientific Inquiry: Science in Daily Life**

- illustrate how science is a part of daily life
- use appropriate scientific skills, tools, and safety procedures to investigate problems;
- examine the connections between science and activities in daily life

### **Chemistry: Properties of Common Materials**

- explain the characteristics and classification of common materials, using appropriate scientific terminology;
- investigate the physical and chemical properties of common materials through laboratory activities;
- analyse how the use of various materials is based on their physical and chemical properties

### **Biology: Staying Alive**

- explain the systems and processes required by simple and complex organisms to sustain life;
- investigate, through laboratory activities, the processes which simple and complex organisms use to sustain life;
- analyse how personal health and safety in everyday life and in the workplace are protected through the proper use of equipment and safety practices.

### **Physics: Electrical Circuits**

- describe the characteristics of electrical circuits;
- investigate simple electrical circuits, using safe practices;
- analyse the practical uses of electrical circuits and their impact on daily life.

## ***Course Content:***

<b>Unit</b>	<b>Length</b>
<b>Science Inquiry: Science in Daily Life</b>	15 hours
<b>Biology: Staying Alive</b>	25 hours
<b>Physics: Electrical Circuits</b>	25 hours
<b>Chemistry: Properties of Common Materials</b>	25 hours
<b>Making Personal Decisions</b>	20 hours
<b>Total</b>	110 hours

## ***Unit Descriptions***

### **Unit 1 Science Inquiry: Science in Daily Life.**

Through study of science and its processes, students can acquire a valuable perspective on the workplace and everyday life. They use critical thinking and inquiry skills that include generating questions and being able to answer those questions experimentally with an understanding of the factors that might affect experimental results; the concept of a fair test. In addition, students learn to use common laboratory tools appropriately and safely and to make connections with how tools used in science are also used in daily life.

As students perform two simple experiments, they analyse the factors that affect the results of the experiments, change one factor, and observe the changes in the results. Students are introduced to a discrepant event, for which they brainstorm and analyse questions as: testable by experiment, answerable by research, or not answerable scientifically. They further analyse the testable questions for practicality. Students are introduced to General Lab Safety Rules. Students devise a fair test method of comparing the bouncibility of a variety of sports balls and write a procedure for their method. They collect results and create bar graphs, which they use to discuss the materials and uses of the particular balls. They write a paragraph on the connection of science to everyday life.

In the final activity, students pose and analyse simple questions of personal choice, plan fair test methods, and conduct experiments to answer the questions and present their results.

### **Unit 2 – Biology : Staying Alive**

This unit connects life-sustaining processes and systems to procedures important for personal safety in the workplace, the home, and everyday life. The skill emphasis is on the development of testable questions.

Students review the concept of life-sustaining processes while reinforcing the skills of observation, data collection, and communication. They pose questions and investigate simple life processes. Students expand their knowledge of the structures and systems required for these life-sustaining processes. The activities, including a safe dissection or simulation, build on an understanding that structures work together in organized systems to support life. Students connect this understanding to their personal lives and future work experiences. They identify the characteristics of a safe workplace and choose personal protective equipment appropriately. They build on Essential Skills needed in the workplace: document use, finding information, and decision making

### **Unit 3 –Physics: Electrical Circuits.**

Students are made aware of the practical uses of electrical circuits in their daily lives. They develop an understanding of current electricity and the role it plays in everyday life. The scientific skill emphasis is on gathering, organizing, and working with qualitative and quantitative data.

Students investigate how the components of circuits work together and build simple circuits that model everyday circuits. They collect data as they measure current and potential difference in various circuits and relate this understanding to everyday electrical devices in circuits. Using a variety of household and workplace devices, they develop a logical checklist for troubleshooting electrical devices.

Safety, experimentation, literacy, and collaboration are integral components of the activities. Students build on the following Essential Skills needed in the workplace: oral and written communication; document use; and thinking skills, including problem solving and decision making.

### **Unit 4 -- Chemistry: Properties of Common Materials.**

Students are made aware that both hazardous and non-hazardous materials surround them in their home, school, and workplace environments and that making decisions about the safe use, handling, and disposal of these materials is an important life skill. The skill emphasis is on inquiry, drawing conclusions, and making decisions based on data. Students develop an understanding of the importance of Household Hazardous Product symbols (HHPs) and Workplace Hazardous Materials Information System (WHMIS) symbols and of following safe procedures when handling common materials.

By designing and conducting laboratory investigations, they gain an understanding of the physical and chemical properties of various common materials and decide on how they can refine their investigation.

Students plan and conduct a safe investigation of two similar materials and recommend the best material for a specified purpose based on its physical and chemical properties. Students practice and refine their literacy and communication skills. The Essential Skills needed in the workplace are problem solving, decision making, and writing. Activities from Unit 5: Making Personal Decisions are interspersed in this unit to permit the preliminary work required for the final task.

### **Unit 5: Making Personal Decisions.**

Students demonstrate the laboratory and technical inquiry skills, communication skills, and the concept of “fair test” that they developed throughout the course. By investigating a personally chosen topic, students collect qualitative and quantitative data through scientific investigations, research a product of their choice, and provide a recommendation for choosing a product.

Students use existing product comparisons to review questioning skills for decision making. They submit a proposal outlining the questions they plan to test and focus on the design of the personal investigation. Students carry out their investigation, evaluate and refine their investigation, and make recommendations. They summarize their investigations and recommendations in a report. Throughout the process, they self-assess and receive teacher and peer feedback to improve their final product.

## ***Teaching/Learning Strategies***

- Lecture (on-line instruction)
- Demonstration (web-based interactive modules)
- Animated Lessons
- Videoconference
- Reading
- Structured Discussion
- Practical Exercise
- Online Tutorials and Movies
- Case Study
- Discovery
- Brainstorming
- Group Work
- Experiments
- Research Projects
- Self Analysis
- Independent Study
- Forum
  
- Exam
  
- Dissection
  
- Field Trip

## ***Evaluation***

**Seventy percent (70%)** of the grade will be based on assessments and evaluations conducted throughout the course.

**Thirty percent (30%)** of the grade will be based on a final evaluation. The evaluations referred to in Unit 5: Making Personal Decisions together form 20% of a student’s report card grade, and will be based on a culminating activity with a number of steps where all of the skills learned throughout the course will be demonstrated using a research project of the students choice. This will be followed by a final exam worth 10% which will be a series of short problems and scenarios where the students will be able to use the skills and knowledge gained.

Type of Assessment	Category	Detail	Weighting
Formative 70%	Knowledge and Understanding	<ul style="list-style-type: none"> <li>- <i>understanding of concepts, principles, laws and theories</i></li> <li>- <i>knowledge of facts and terms</i></li> <li>- <i>transfer of concepts to new contexts</i></li> <li>- <i>understanding of relationships between concepts</i></li> </ul>	18%
	Inquiry	<ul style="list-style-type: none"> <li>- <i>application of the skills and strategies of scientific inquiry</i></li> <li>- <i>application of technical skills and procedures</i></li> <li>- <i>use of tools, equipment and materials</i></li> </ul>	13%
	Communication	<ul style="list-style-type: none"> <li>- <i>communication of information and ideas</i></li> <li>- <i>use of scientific terminology, symbols, conventions and standard (SI) units</i></li> <li>- <i>use of various forms of communication</i></li> <li>- <i>use of information technology for scientific purposes</i></li> </ul>	21%
	Making Connections	<ul style="list-style-type: none"> <li>- <i>understanding connections among science, technology, society and the environment</i></li> <li>- <i>analysis of social and economic issues involving science and technology</i></li> <li>- <i>assessment of impacts of science and technology on the environment</i></li> <li>- <i>proposing courses of practical action in relation to science- and technology-based problems</i></li> </ul>	18%

<b>Final Assessment</b>  <b>Culminating Activity 20%</b>	<b>Knowledge &amp; Understanding</b>	<i>Making Personal Decisions together form the final 30% of a student's report card grade, and will be based on a final cumulative activity made up of several parts where all of the skills learned throughout the course will be demonstrated using a research project of the students choice. Evaluation includes a test, a proposal, a plan, a peer assessment, teacher conference, an experiment, and a report. The four categories of learning expectations will be included in differing proportions in each task with the overall weighting as follows:</i>	5%
	<b>Inquiry</b>		4%
	<b>Communication</b>		6%
	<b>Making Connections</b>		5%
<b>Final Exam 10%</b>	<b>Knowledge &amp; Understanding</b>	<i>A series of short problems and scenarios where the students will be able to use the skills and knowledge gained in the course.</i>	2.5%
	<b>Inquiry</b>		2%
	<b>Communication</b>		3%
	<b>Making Connections</b>		2.5%

## *Assessment/Evaluation Strategies*

### **"Paper and Pencil"**

tests, exams  
quizzes  
work sheets

### **Other**

teacher anecdotal records  
teacher log  
checklists  
rubrics

### **Performance Methods**

experiments  
portfolios  
presentations  
demonstrations  
diagrams  
constructions  
proposals  
reports

### **Personal Communication**

interviews  
forums  
self evaluation  
peer evaluation

## *Resources listed in Bibliographical style*

Science Power 9, McGraw-Hill Ryerson, 1999

### **Internet sites as per teacher's lessons.**

Association for the Advancement of Science [www.aaas.org/](http://www.aaas.org/)

Product Review and Reports [www.consumersearch.com/](http://www.consumersearch.com/)

Canadian Space Agency Resource Centre [www.spacenet@eybe.edu.on.ca](mailto:www.spacenet@eybe.edu.on.ca)

Canadian Space Agency [www.space.gc.ca](http://www.space.gc.ca)

Bill Nye the Science Guy [nyelabs.kcts.org/](http://nyelabs.kcts.org/)

The Why Files [whyfiles.news.wisc.edu/](http://whyfiles.news.wisc.edu/)

About Chemistry [chemistry.about.com](http://chemistry.about.com)

Hands-on Science Activities [www.letstalkscience.uwo.ca](http://www.letstalkscience.uwo.ca)

Explore Learning [www.explorelearning.com](http://www.explorelearning.com)

How Stuff Works [www.howstuffworks.com](http://www.howstuffworks.com)

Science Teacher Resource Page [www.educ.queens.ca/~science/](http://www.educ.queens.ca/~science/)

## ***Program Planning***

This version of SNC1L is offered to students living in isolated northern First Nation communities which do not have access to the usual high school facilities, equipment or teachers associated with secondary education. The course uses the global connections of the Internet for some instruction, direction and research. It is a student-centered semi-virtual classroom .