



## Ontario eSecondary School Course Outline 2020-2021

<b>Ministry of Education Course Title:</b> Academic Science 9	
<b>Ministry Course Code:</b> SNC1D	
<b>Course Type:</b> Academic	
<b>Grade:</b> 9	
<b>Credit Value:</b> 1.0	
<b>Prerequisite(s):</b> None	
<b>Department:</b> Science	
<b>Course developed by:</b> Kiran Sandhar	<b>Date:</b> May 1st, 2020
<b>Length:</b> One Semester	<b>Hours:</b> 110
This course has been developed based on the following Ministry documents: <ol style="list-style-type: none"><li>1. <i>Science, The Ontario Curriculum, Grade 9, 2007, (revised)</i></li><li>2. <i>Growing Success: Assessment, Evaluation, and Reporting in Ontario Schools (2010)</i></li><li>3. <i>Learning for All (2013)</i></li></ol>	

## **COURSE DESCRIPTION/RATIONALE**

This course enables students to develop their understanding of basic concepts in biology, chemistry, earth and space science and physics, and to apply their knowledge of science to everyday situations. They are also given opportunities to develop practical skills related to scientific investigation. Students will plan and conduct investigations into practical problems and issues related to the impact of human activity on ecosystems; the structure and properties of elements and compounds; space exploration and the components of the universe; and static and current electricity.

## **OVERALL CURRICULUM EXPECTATIONS**

### **Unit 1: Chemistry**

By the end of this course, students will:

- assess social, environmental, and economic impacts of the use of common elements and compounds, with reference to their physical and chemical properties
- investigate, through inquiry, the physical and chemical properties of common elements and compounds
- demonstrate an understanding of the properties of common elements and compounds, and of the organization of elements in the periodic table.

### **Unit 2: Electricity**

By the end of this course, students will:

- assess some of the costs and benefits associated with the production of electrical energy from renewable and non-renewable sources, and analyse how electrical efficiencies and savings can be achieved, through both the design of technological devices and practices in the home
- investigate, through inquiry, various aspects of electricity, including the properties of static and current electricity, and the quantitative relationships between potential difference, current, and resistance in electrical circuits
- demonstrate an understanding of the principles of static and current electricity.

### **Unit 3: Ecology**

By the end of this course, students will:

- assess the impact of human activities on the sustainability of terrestrial and/or aquatic ecosystems, and evaluate the effectiveness of courses of action intended to remedy or mitigate negative impacts
- investigate factors related to human activity that affect terrestrial and aquatic ecosystems, and explain how they affect the sustainability of these ecosystems
- demonstrate an understanding of the dynamic nature of ecosystems, particularly in terms of ecological balance and the impact of human activity on the sustainability of terrestrial and aquatic ecosystems.

### **Unit 4: Astronomy**

By the end of this course, students will:

- assess some of the costs, hazards, and benefits of space exploration and the contributions of Canadians to space research and technology
- investigate the characteristics and properties of a variety of celestial objects visible from Earth in the night sky
- demonstrate an understanding of the major scientific theories about the structure, formation, and evolution of the universe and its components and of the evidence that supports these theories.

## COURSE CONTENT

<i>Unit</i>	<i>Length</i>
Unit 1: Chemistry	27 hours
Unit 2: Electricity	28 hours
Unit 3: Ecology	23 hours
Unit 4: Astronomy	24 hours
Unit 5: Culminating Project and Final Exam	8 hours

## UNIT DESCRIPTIONS

### UNIT 1: CHEMISTRY

In this unit, students will explore elements and compounds that have specific properties that determine their uses. They will understand the use of elements and compounds has both positive and negative effects on society and the environment.

### UNIT 2: ELECTRICITY

In this unit, students will explore electricity. It is a form of energy produced from a variety of non-renewable and renewable sources. Students will learn about the production and consumption of electrical energy has social, economic, and environmental implications. Lastly, they will understand that static and current electricity have distinct properties that determine how they are used.

### UNIT 3: ECOLOGY

In this unit, students will explore ecosystems that consist of a variety of components, including, in many cases, humans. They will learn about the sustainability of ecosystems depends on balanced interactions between their components. Lastly, students will understand that human activity can affect the sustainability of aquatic and terrestrial ecosystems.

### UNIT 4: ASTRONOMY

In this unit, students will explore celestial objects in the solar system and learn that the universe has specific properties that can be investigated and understood. Students will learn about the various technologies developed for space exploration and have practical applications on Earth.

## TEACHING AND LEARNING STRATEGIES

**The students will experience a variety of activities:**

**Video presentations** and technological aids (research) with videos embedded to enrich the course content and clarify concepts and skills being studied. Also the use of online pre-approved quizzes and games to help a student become more familiar with the concepts and skills being studied.

**Diagnostic and review activities** (audio and video taping) can be student-lead or teacher lead to work as a review for students through audio and video made to share among each other to help reinforce the concepts and skills being studied.

**Brainstorming, charts and graphs** are a great way for students to demonstrate their knowledge of subject matter through graphic organizers, pictures, and texts. This is communicated through assignments in Moodle.

### **Small Group Activities**

The teacher sets up small group activities to provide opportunities for active and oral learning as well as to bolster practical communication and teamwork skills. The teacher plays a critical role during group activities by monitoring group progress as well as answering questions that arise and using questions to assist students in their understanding. In this way, the teacher also facilitates student understanding of effective learning, communication, and team building during group activities.

#### **The small group activities include the following:**

**Practical extension and application of knowledge** is used as an effective learning strategy in this course because it allows the students to read and listen to the texts and stories and reflect back with connections to themselves, other texts and the world. Students are encouraged to share their understandings through work submitted each day, phone conversations about course work, or videoconferencing.

**Oral presentations** in an online environment we have the equipment to have student either live video conference oral presentations, or make videos and submit them for their oral presentations. These oral presentations can be viewed by fellow students (when appropriate) and the teacher. Students can learn from one another, and from their teacher. Such activities include dramatic readings and performances.

**Charts and graphs** are used to present effective learning opportunities of concepts and skills to students who would benefit from visual objects to learn. Every student learns differently, and it is used to help students discover another way to present their information such as graphic organizers, lists, and pictures.

### **Individual Activities**

The teacher should provide a variety of individual assignments to expand and consolidate the learning that takes place in the whole-class and small group activities. Individual activities allow the teacher to accommodate interests and needs and to assess the progress of individual students. The teacher plays an important role in supporting these activities through the provision of ongoing feedback to the students, both orally and in writing. Teachers are encouraged to include individual activities such as the following in the course:

**Research** is completed in an online environment by teaching the students first about plagiarism rules and giving examples of good sources to use. The students are not only limited to the online search for information, but have resources available by links on the Moodle page of information that has been scanned and uploaded.

**Individual assignments** are worked on at a student's own pace. The teacher can support the student in these activities with ongoing feedback.

**Oral presentations** are facilitated through the use of video conferencing and video recording.

**Practical extension and application of knowledge** helps students develop their own voice, and gives them the ability to make personal connections, and connections to the world throughout their course. Students are given a variety of reading and viewing texts to give them many chances to apply their new concepts, skills, and knowledge.

**Reading** students are able to read a variety of texts online. The students may print out the reading material to use it to highlight, take notes, and have with them when a computer is not available.

**Written assignments** are used to allow students to develop their skills in writing, comprehension, and communication. With the online format students submit their work, and have a chance to get feedback from the teacher, and submit their best work. This can be demonstrated with reading responses, personal writing, report writing, essay writing, script writing, business and technical writing, and individual research assignments.

**Reflective/Comparative Analysis** for students working in their portfolios, giving them an opportunity for self-reflection on their accomplishments, skills, and concepts learned over the year. This can be accomplished with student and teacher conferences as well.

## ASSESSMENT, EVALUATION, AND REPORTING

**Assessment:** The process of gathering information that accurately reflects how well a student is achieving the identified curriculum expectations. Teachers provide students with descriptive feedback that guides their efforts towards improved performance.

**Evaluation:** Assessment of Learning focuses on Evaluation which is the process of making a judgement about the quality of student work on the basis of established criteria over a limited, reasonable period of time.

**Reporting:** Involves communicating student achievement of the curriculum expectations and Learning Skills and Work Habits in the form of marks and comments as determined by the teacher's use of professional judgement.

## STRATEGIES FOR ASSESSMENT

Assessment practices can nurture students' sense of progress and competency and information instruction. Many diagnostic tools, e.g. checklists and inventories, are used at regular intervals throughout the units to encourage students' understanding of their current status as learners and to provide frequent and timely reviews of their progress. Assessment of student acquisition of listening and talking, reading and viewing and writing skills also occurs regularly through unobtrusive teacher observation and conferencing.

Units conclude with performance tasks, e.g., interviews and from essays that build towards and prepare students for the end-of-course culminating task in Unit Five. Teachers are encouraged to share goals with students early in the course and to connect unit learning experiences frequently and explicitly with big ideas, overall expectations, and performance tasks, i.e. check bricks; teacher-adapted generic rubrics available in many sources, including the *Ontario Secondary School Literacy Course (OSSLC) Profile*, so that they are more task-specific. The teacher might ask: "What does the criteria look like for this particular task?" Or "What does limited effectiveness look like?" The teacher could involve students in the discussion, modification, or creation of rubrics, and teach students to use rubrics as a learning tool that can support the writing process and practice.

## ASSESSMENT ACTIVITIES

- Homework assignments
- Individual conference meetings
- Diagnostic tests and writing tasks
- Completed Templates & Graphic Organizers
- Reflections
- Oral presentations & Active Listening
- Evaluations
- Lab Reports

## EVALUATION

The final grade will be determined as follows:

- ❑ Seventy percent of the grade will be based on evaluation conducted throughout the course. This portion of the grade should reflect the student’s most consistent level of achievement throughout the course, although special consideration will be given to more recent evidence of achievement.
- ❑ Thirty percent of the grade will be based on a final evaluation administered at or towards the end of the course. This evaluation will be based on evidence from one or a combination of the following: an examination, a performance, an essay, and/or another method of evaluation suitable to the course content. The final evaluation allows the student an opportunity to demonstrate comprehensive achievement of the overall expectations for the course.

(*Growing Success: Assessment, Evaluation and Reporting in Ontario Schools*. Ontario Ministry of Education Publication, 2010 p.41)

<b>Weight</b>	
<b>Course Work</b>	<b>70</b>
Knowledge/Understanding	17.5
Thinking/Inquiry	17.5
Communication	17.5
Application	17.5
<b>Final</b>	<b>30</b>
Exam	20
Culminating Project	10

### TERM WORK EVALUATIONS (70%):

Evaluation Item	Description	Category	Weight Factor (1-10)
Critical Thinking: Research Projects	Research-based projects for each unit based on applications of learned functions to real life problems	K,T,C,A	10
Simulations/Live interview evaluations	Live interviews are used to evaluate students through observation and conversation. Students will answer questions on the unit big ideas.	K,T,C,A	5
Unit Assessments(s)	Unit assessments are based on curriculum expectations and cover the entirety of each unit	K,T,C,A	10

### FINAL EVALUATIONS (30%):

Evaluation Item	Description	Category
Final Exam 20%	A final, written examination, covering all curriculum expectations for the course.	K,T,C,A
Culminating Project 10%	A comprehensive project, covering all overall curriculum expectations for the course.	K,T,C,A

## AFL/AAL/AOL Tracking sheet:

### Unit 1: Chemistry

AAL	AFL	AOL
1.2 Phases of Matter Gizmo 1.3 Chemical vs Physical Changes Practice 1.4 Density Gizmo 1.5 Calculating P.E.N 1.6 Element Builder Gizmo 1.7 Trends of the Periodic Table 1.8 Counting Compounds & Molecules	1.1 Scientific Method 1.2 Particle Theory 1.3 Chemical vs Physical Changes Applications 1.4 Density Columns 1.6 Bohr Rutherford Diagram Practice 1.9 Classifying Matter	1.10 Chemistry Unit Assessment 1.10 Superhero Element Project 1.10 End of Unit Interview

### Unit 2: Electricity

AAL	AFL	AOL
2.1 Electric Charges 2.3 Static Applications & Myths 2.4 Online Virtual Lab- Series & Parallel 2.5 Online Virtual Lab- Series & Parallel 2.7 Household Energy Gizmo 2.8 Generating Electricity	2.2 Charging an Object Simulations 2.4 Drawing Circuit Diagram 2.5 Voltage & Current Practice 2.6 Resistance and Ohm's Law 2.7 Electricity Consumption	2.9 Electricity Unit Assessment 2.9 Wiring & Powering a House Project 2.9 End of Unit Interview

### Unit 3: Ecology

AAL	AFL	AOL
3.2 Photosynthesis & Cellular Respiration 3.3 Feeding Relationships 3.4 Food Chains Gizmo 3.5 Carbon and Nitrogen Cycle Interactives 3.6 Forest Ecosystems Gizmo	3.1 Biotic & Abiotic Factors 3.3 Food Chains & Webs 3.4 Population Graphs 3.6 Invasive & Endangered Species Research	3.7 Ecology Unit Assessment 3.7 Operation Cat Drop Project 3.7 End of Unit Interview

### Unit 4: Astronomy

AAL	AFL	AOL
4.3 Celestial Objects 4.4 H-R Diagrams Gizmo 4.5 Big Bang Theory & Galaxies 4.7 Humans & Space Exploration	4.1 Introduction to Astronomy 4.2 Planetary Database 4.4 Stars & Constellations 4.6 Motions & Distances in Space	4.8 Astronomy Unit Assessment 4.8 Investigating Solar System KB35 Project 4.8 End of Unit Interview

### End of Course: Final Tasks

<b>AOL (30% of Final Mark)</b>
<b>Culminating Activity (10%): Designing a Colony</b>
<b>Final Exam (20%)</b>

## CONSIDERATION FOR PROGRAM PLANNING

### PLANNING PROGRAMS FOR STUDENTS WITH SPECIAL EDUCATION NEEDS

Classroom teachers are the key educators of students who have special education needs. They have a responsibility to help all students learn, and they work collaboratively with special education teachers, where appropriate, to achieve this goal. Special Education Transformation: The Report of the Co-Chairs with the Recommendations of the Working Table on Special Education, 2006 endorses a set of beliefs that should guide program planning for students with special education needs in all disciplines. Those beliefs are as follows: All students can succeed. Universal design and differentiated instruction are effective and interconnected means of meeting the learning or productivity needs of any group of students. Successful instructional practices are founded on evidence-based research, tempered by experience.

### PROGRAM CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

Ontario schools have some of the most multilingual student populations in the world. The first language of approximately 20 percent of the students in Ontario's English language schools is a language other than English. Ontario's linguistic heritage includes several Aboriginal languages; many African, Asian, and European languages; and some varieties of English, such as Jamaican Creole. Many English language learners were born in Canada and raised in families and communities in which languages other than English were spoken, or in which the variety of English spoken differed significantly from the English of Ontario classrooms. Other English language learners arrive in Ontario as newcomers from other countries; they may have experience of highly sophisticated educational systems, or they may have come from regions where access to formal schooling was limited. When they start school in Ontario, many of these students are entering a new linguistic and cultural environment.

### THE ROLE OF TECHNOLOGY IN THE PROGRAM

Information and communications technologies (ICT) provide a range of tools that can significantly extend and enrich teachers' instructional strategies and support students' language learning. ICT tools include multimedia resources, databases, Internet websites, digital cameras, and word-processing programs. Tools such as these can help students to collect, organize, and sort the data they gather and to write, edit, and present reports on their findings. Information and communications technologies can also be used to connect students to other schools, at home and abroad, and to bring the global community into the local classroom. Whenever appropriate, therefore, students should be encouraged to use ICT to support and communicate their learning.

### ACCOMMODATIONS

Accommodations will be based on meeting with parents, teachers, administration and external educational assessment reports. The following three types of accommodations may be provided:

- Instructional accommodations:** such as changes in teaching strategies, including styles of presentation, methods of organization, or use of technology and multimedia.
- Environmental accommodations:** such as preferential seating or special lighting.
- Assessment accommodations:** such as allowing additional time to complete tests or assignments or permitting oral responses to test questions.

Other examples of modifications and aids, which may be used in this course, are:

- Provide step-by-step instructions.
- Help students create organizers for planning writing tasks.
- Record key words on the board or overhead when students are expected to make their own notes.
- Allow students to report verbally to a scribe (teacher/ student) who can help in note taking.
- Permit students a range of options for reading and writing tasks.
- Where an activity requires reading, provide it in advance.
- Provide opportunities for enrichment.