

## Canada Agile Preparatory Academy

### Course outline

Ministry of Education Course Title: Science, Grade 10, Academic

Ministry Course Code: SNC2D

Course Type: Academic

Grade: 10

Credit Value: 1.0

Prerequisite(s): SNC1D Academic Grade 9 Science, or SNC1P Applied Grade 9 science

Department: Science

Course developer: Canada Agile Preparatory Academy

Development Date: Apr 6<sup>th</sup>, 2020

This course has been developed based on the following Ministry documents:

- The Ontario Curriculum, Grades 9 and 10 Science, Revised 2008
- Growing Success: Assessment, Evaluation, and Reporting in Ontario Schools (2010)

Revision Date: May 21<sup>st</sup> 2020

## Course Description/Rationale

This course enables students to enhance their understanding of concepts in biology, chemistry, earth and space science, and physics, and of the interrelationships between science, technology, society, and the environment. Students are also given opportunities to further develop their scientific investigation skills. Students will plan and conduct investigations and develop their understanding of scientific theories related to the connections between cells and systems in animals and plants; chemical reactions, with a particular focus on acid/base reactions; forces that affect climate and climate change; and the interaction of light and matter.

### Big Ideas

#### Biology

- Plants and animals, including humans, are made of specialized cells, tissues, and organs that are organized into systems.
- Developments in medicine and medical technology can have social and ethical implications.

#### Chemistry

- Chemicals react with each other in predictable ways.
- Chemical reactions may have a negative impact on the environment, but they can also be used to address environmental challenges.

#### Earth and Space Science

- Earth's climate is dynamic and is the result of interacting systems and processes.
- Global climate change is influenced by both natural and human factors.
- Climate change affects living things and natural systems in a variety of ways.
- People have the responsibility to assess their impact on climate change and to identify effective courses of action to reduce this impact.

#### Physics

- Light has characteristics and properties that can be manipulated with mirrors and lenses for a range of uses.
  - Society has benefited from the development of a range of optical devices and technologies.

## Overall Curriculum Expectations

<b>A. SCIENTIFIC INVESTIGATION SKILLS AND CAREER EXPLORATION</b>	
A1	demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analysing and interpreting, and communicating)
A2	identify and describe careers related to the fields of science under study, and describe the contributions of scientists, including Canadians, to those fields.
<b>B. BIOLOGY: TISSUES, ORGANS, AND SYSTEMS OF LIVING THINGS</b>	
B1	evaluate the importance of medical and other technological developments related to systems biology, and analyse their societal and ethical implications;

B2	investigate cell division, cell specialization, organs, and systems in animals and plants, using research and inquiry skills, including various laboratory techniques;
B3	demonstrate an understanding of the hierarchical organization of cells, from tissues, to organs, to systems in animals and plants.
<b>C. CHEMISTRY: CHEMICAL REACTIONS</b>	
C1	analyse a variety of safety and environmental issues associated with chemical reactions, including the ways in which chemical reactions can be applied to address environmental challenges;
C2	investigate, through inquiry, the characteristics of chemical reactions;
C3	demonstrate an understanding of the general principles of chemical reactions, and various ways to represent them.
<b>D. EARTH AND SPACE SCIENCE: CLIMATE CHANGE</b>	
D1	analyse some of the effects of climate change around the world, and assess the effectiveness of initiatives that attempt to address the issue of climate change;
D2	investigate various natural and human factors that influence Earth's climate and climate change;
D3	demonstrate an understanding of natural and human factors, including the greenhouse effect, that influence Earth's climate and contribute to climate change.
<b>E. PHYSICS: LIGHT AND GEOMETRIC OPTICS</b>	
E1	evaluate the effectiveness of technological devices and procedures designed to make use of light, and assess their social benefits;
E2	investigate, through inquiry, the properties of light, and predict its behaviour, particularly with respect to reflection in plane and curved mirrors and refraction in converging lenses;
E3	demonstrate an understanding of various characteristics and properties of light, particularly with respect to reflection in mirrors and reflection and refraction in lenses.

### Major Units and Corresponding Hours

Course Parts	Time Allocated
Unit 1 - Chemistry: Chemical Reactions	28
Unit 2 - Physics: Light and Geometric Optics	26
Unit 3 - Biology: Tissues, Organs, and Systems of Living things	29

Unit 4 - Earth & Space Science: Climate Change	15
Cumulative Course Project	10
Final Exam	2 hours
Total Time	110 hours

The curriculum expectations of *Scientific Investigation Skills and Career Exploration* are intertwined with each unit above. Therefore, the expectations of *Scientific Investigation Skills and Career Exploration* will be emphasized and achieved through the execution of each individual unit.

All course content is accessed online.

### **Teaching & Learning Strategies**

The aim of the course is to help students deepen their understanding of scientific concepts and theories. The course explains difficult concepts in a manner that is easy to understand.

There will be ample opportunities for students and the teacher to engage in 1 to 1 correspondence and discussion. Independent, self-regulated learning will also be required along with teacher facilitation.

Example exercises and problems will be included in worksheet format, also requiring individual research from external sources.

### **Strategies for Assessment & Evaluation of Student Performance**

The assessment and evaluation strategies of our school follows the Ministry of Education's Growing Success document. Growing Success articulates the vision the Ministry has for the purpose and structure of assessment and evaluation techniques.

Assessments help to monitor student progression and provide reflection and feedback. Evaluation is the process of judging the quality of student work in relation to the achievement chart categories and criteria, and assigning a percentage grade to represent that quality. Evaluation is based on gathering evidence of student achievement through:

- Products
- Observations
- Conversations

### **The Final Grade**

The evaluation for this course is based on the student's achievement of curriculum expectations and the demonstrated skills required for effective learning. The final percentage grade represents the quality of the student's overall achievement of the expectations for the course and reflects the corresponding level of achievement as described in the achievement chart for the discipline. A credit is granted and recorded for this course if the student's grade is 50% or higher. The final grade will be determined as follows:

70% of the grade will be based upon evaluations conducted throughout the course. This portion of the grade will reflect the student's most consistent level of achievement through the course. The balance of 30% of the grade will be based on final evaluations administered at the end of the course. The final assessment may be a final exam, a final project, or a combination of both an exam and a project.

### **Assessment Tools and Strategies**

Assessments are broken down into three categories:

- *Assessments for learning*: Worksheets and quizzes to gauge student progression and provide feedback.
- *Assessments as learning*: Journals to record reflections on the course material and self-assessments.
- *Assessments of learning*: Tests and assignments given a final grade based on how well the learning goals are met towards the course expectations.

### **Considerations for Program Planning**

**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. 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.

Our teachers consider it to be his or her responsibility to help students develop their ability to use the English language properly. Appropriate accommodations affecting the teaching, learning, and evaluation strategies in this course may be made in order to help students gain proficiency in English, since students taking English as a second language at the secondary level have limited time in which to develop this proficiency.

**For students with special educational needs:** Our teachers are committed to ensuring that all students, especially those with special education needs, are provided with the learning opportunities and supports they require to gain the knowledge, skills, and confidence needed to succeed in a rapidly changing society.

**Environmental education:** This course integrates environmental education into the teaching of Physics. Students have opportunities to analyze the environmental impact of climate change, for example.

**Equity and inclusive education:** Our teachers create an environment that will foster a sense of community where all students feel included and appreciated. Students see themselves reflected in the choices of issues, examples, materials, and resources selected by our teachers.

**Literacy and Inquiry/Research Skills:** The school emphasizes the importance of the following:

- using clear, concise communication in the classroom involving the use of diagrams, charts, tables, and graphs
- emphasizing students' ability to interpret and use graphic texts.
- acquiring the skills to locate relevant information from a variety of sources, such as books, newspapers, dictionaries, encyclopaedias, interviews, videos, and the Internet.
- learning that all sources of information have a particular point of view
- learning that the recipient of the information has a responsibility to evaluate it, determine its validity and relevance, and use it in appropriate ways.

**The role of information and communications technology:** Technological tools are first-class citizens at our online school and are used in many ways:

- Students use multimedia resources, databases, Internet websites, digital cameras, and word-processing programs.
- They use technology to collect, organize, and sort the data they gather and to write, edit, and present reports on their findings.
- Students are encouraged to use ICT to support and communicate their learning. For example, students working individually or in groups can use computer technology and/or Internet websites to gain access to museums and archives in Canada and around the world.
- Students use digital cameras, webcams, and screen recording software to design and present the results of their research.

**Career Education:** Students are given opportunities to develop career-related skills by:

- applying their skills to real-life situations
- exploring educational and career options
- developing research skills
- making oral presentations

**Resources required by the student**

- Internet access and a modern standards-compliant web browser
- A non-programmable, non-graphing, scientific calculator.
- A scanner, smart phone camera, or similar device to upload handwritten or hand-drawn work
- A front-facing camera such as a webcam to allow for remote proctoring over the internet
- Textbook: Pearson Investigating Science 10 (2009) ISBN: 9780132080712 or Nelson Science Perspectives 10 (2010) ISBN: 9780176355289