Science, Grade 9, Academic

Course Title: Science
Course Code: SNC1D
Grade: 9
Course Type: Academic
Credit Value: 1.0
Prerequisites: None

Curriculum Document: Science, Revised (2008)
Course Developer: Sarah McKercher
Department: Science
Development Date: September 2020
Most Recent Revision Date: September 2020

Teacher(s):

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Course Description:

This course enables students to develop their understanding of basic concepts in biology, chemistry, earth and space science, and physics, and to relate science to technology, society, and the environment. Throughout the course, students will develop their skills in the processes of scientific investigation. Students will acquire an understanding of scientific theories and conduct investigations related to sustainable ecosystems; atomic and molecular structures and the properties of elements and compounds; the study of the universe and its properties and components; and the principles of electricity.

Unit Title and Description	Time Allocated
Biology: Sustainable Ecosystems Biology, which is the study of living things, includes learning about the structure, function, growth, origin, evolution, and distribution of living organisms. This unit focuses mainly on ecology, which is the strand of biology that analyzes the relationships between living things and their physical environments. While biology is the study of life, ecology takes into account how non-living things affect the well-being and development of the living things in a certain geographic area. *Throughout this unit students will learn about the different components of an ecosystem, from the plants and animals that live in them, to the soils and water that sustain them. Students will learn about how humans have impacted terrestrial and aquatic ecosystems in both negative and positive ways. They will analyze data to assess these impacts, from population numbers to soil composition, and they will also research and evaluate the success of different group initiatives to conserve and restore different ecosystems.*	27 Hours

Chemistry: Atoms, Elements, and Compounds *In this unit students will be introduced to the basics of chemistry and to the atom, the basic unit of the elements that make up all matter on Earth. Students will learn how the elements are organized on the periodic table and how to use this valuable tool to learn more about the shared characteristics of certain groups of elements. This unit will also teach students about the history of the atomic model and how it has changed over the years. They will even have a chance to draw some Bohr-Rutherford diagrams to represent elements. As students progress throughout the unit, we will shift our focus to common compounds that are already familiar to them. They will learn how to assess the usefulness and hazards of substances we use every day. We use this skill to ensure that the substances we use are safe and effective.*	27 Hours
Earth and Space Science: The Study of the Universe *Astronomy*, derived from Greek for "the law of the stars," is the study of the physical and chemical properties of everything beyond Earth's atmosphere. Basically, astronomy is the study of outer space. *This unit is meant to provide a short introduction to astronomy. Students will learn about the universe and its components, among them, our solar system and its planets, moons, and stars. They will learn how to locate and describe celestial objects in the night sky and understand the current and past cultural and practical value of these objects. Finally, students will study humankind's attempts to explore space, including famous Canadian astronomers and Canada's technological contributions to space exploration.*	27 Hours
Physics: The Characteristics of Electricity One strand of physics is electrical engineering. Electrical engineers develop solutions for producing electricity and using it to accomplish goals. Students are not going become a qualified electrical engineer in this course, but they will have an opportunity to begin their study of electricity. *In this unit, students will treat electricity as a serious discipline of physics. They will be quantitative—in other words, they'll start measuring factors that are important for describing electricity. Students will understand and describe current, voltage, and resistance and will consider more deeply the effects that the human consumption of electricity has on the environment. Finally, students will explore some of the interesting career paths relating physics and its branch of electricity.*	27 Hours
Final Assessment The final assessment in this course consists of an exam worth 30% of a student's final grade.	2 Hours

Overall Curriculum Expectations
Scientific Investigation Skills and Career Exploration

1. demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analyzing and interpreting, and communicating);
2. identify and describe a variety of careers related to the fields of science under study, and identify scientists, including Canadians, who have made contributions to those fields.

Biology: Sustainable Ecosystems

1. 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;
2. investigate factors related to human activity that affect terrestrial and aquatic ecosystems, and explain how they affect the sustainability of these ecosystems;
3. 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.

Chemistry: Atoms, Elements, and Compounds

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

Earth and Space Science: The Study of the Universe

1. assess some of the costs, hazards, and benefits of space exploration and the contributions of Canadians to space research and technology;
2. investigate the characteristics and properties of a variety of celestial objects visible from Earth in the night sky;
3. 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.

Physics: The Characteristics of Electricity

1. 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;
2. 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;
3. demonstrate an understanding of the principles of static and current electricity.

Resources Required:

This course is entirely online and does not require nor rely on any textbook. The materials required for the course are:

- A smart phone, camera, or similar device to record video and sound,
- A scanner, smart phone camera, or similar device to upload handwritten or hand-drawn work,
- Online access to third party software.

Teaching and Learning Strategies:

Teaching and learning strategies assist both teachers and students in achieving specific learning objectives. A number of methods have been used to create an online learning environment that will engage students in a variety of ways and support their understanding of scientific concepts. These strategies may include:

- Clearly described unit expectations
- Hands-on lab activities
- Virtual lab activities
- Virtual field trips
- Animations and simulations
- Creative problem solving
- Case Studies
- Assessment FOR learning activities
- Student reflection and self-assessment
- Discussions of issues relating science to technology, society, and the environment
- Research Reports
- Opinion-based Reports
- Concept-supporting games
- Model building
- Field observations

Assessment and Evaluation Strategies

Every student attending Christian Virtual School is unique. We believe each student must have the opportunities to achieve success according to their own interests, abilities, and goals. Like the Ministry of Education, we have defined high expectations and standards for graduation, while introducing a range of options that allow students to learn in ways that suit them best and enable them to earn their diplomas. Christian Virtual School's Assessment, Evaluation, and Reporting Policy is based on seven fundamental principles, as outlined in the Growing Success: Assessment, Evaluation, and Reporting in Ontario Schools document.

When these seven principles are fully understood and observed by all teachers, they guide the collection of meaningful information that helps inform instructional decisions, promote student engagement, and improve student learning. At Christian Virtual School, teachers use practices and procedures that:

- are fair, transparent, and equitable for all students;
- support all students, including those with special education needs, those who are learning English, and those who are First Nation, Métis, or Inuit;
- are carefully planned to relate to the curriculum expectations and learning goals and, as much as possible, to the interests, learning styles and preferences, needs, and experiences of all students;
- are communicated clearly to students and parents or guardians at the beginning of the school year or course and at other appropriate points throughout the school year or course;
- are ongoing, varied in nature, and administered over a period of time to provide multiple opportunities for students to demonstrate the full range of their learning;
- provide ongoing descriptive feedback that is clear, specific, meaningful, and timely to support improved learning and achievement; and
- develop students' self-assessment skills to enable them to access their own learning, set specific goals, and plan next steps for their learning.

For more information on Christian Virtual School's assessment and evaluation strategies, you can refer to our Assessment, Evaluation, and Reporting Policy.

Program Planning Considerations

Each of our courses have been designed by a team of educators to create an environment infused with creativity, flexibility, choice, and variety, with the goal to help every student succeed. We also take into consideration several topics that span disciplines and ensure we incorporate these into each of our courses.

Program Planning Considerations
Students with Special Needs Christian Virtual School is committed to ensuring that all students are provided with the learning opportunities and supports they require to succeed. Our courses are made to offer flexible, personalized learning experiences. By maintaining an asynchronous model, students can move through their courses at their own pace, ensuring they are able to take the time they need to understand concepts or work with their teacher if they hit roadblocks. Christian Virtual School courses also incorporate choice, allowing students to submit work in a variety of mediums or formats to communicate their ideas. In addition to the flexibility built into the courses, Christian Virtual School will implement the accommodations that are listed in a student's Individual Education Plan (IEP) that are applicable to the online learning environment. In these cases, the learning expectations will be the same as or similar to the expectations outlined in the curriculum document but supports will be provided to help students achieve those expectations. Common accommodations in the environment are reducing the workload, simplifying tasks and materials, providing extra time for tests and exams, allowing scribing or the use of specialized equipment, and not deducting marks for spelling.

English Language Learners

Although all our courses are only offered in English at this time, Christian Virtual School welcomes students learning the English language. Students do need to meet a baseline proficiency level to access the content, but Christian Virtual School teachers are responsible for helping students develop their English literacy skills no matter the course they are enrolled in.

Upon enrollment, students are asked if they would like to provide information about their English language background, and this information is used by our teachers to help them adjust their instruction and suggest accommodations within the courses. English language learners are encouraged to reach out to their teacher or the Christian Virtual School administration to talk about the accommodation options in their courses so that the appropriate opportunities are given to everyone.

Environmental Education

Christian Virtual School operates with 5 cores values: responsibility, perseverance, integrity, compassion, and community. These core values determine our business operations, as well as exemplify what we, as educations, want to instill in our students. Environmental education, among other causes, are important to us as a school and we strive to promote learning about these issues and solutions within our courses. We work to educate students on the environment, its threats, and the importance of sustainability. We also work to inspire students to make an impact within their community and identify an alignment between their passions and the local, or global, needs.

Environmental education is woven throughout our course content, across all disciplines. Depending on the course and subject matter, this education can be subtle or explicit, but the goal is to ensure that students have the opportunity to acquire the knowledge, skills, perspective and practices needed to become an environmentally literate citizen.

Equity and Inclusive Education

Christian Virtual School stands on the belief that every person is unique and, regardless of ancestry, culture, ethnicity, sex, physical or intellectual ability, race, religion, sexual orientation, socio-economic status, or other similar factor, they are to be welcomed, included, accepted, treated fairly, and respected. As a school, we teach students about multiple worldviews, how to identify and acknowledge similarities and differences, and how to communicate with others in an inclusive, kind, loving, and compassionate way.

Diversity is valued at Christian Virtual School, and it is our goal to ensure all members of the community feel safe, comfortable, and accepted. Our courses are written to draw attention to the contributions of men and woman alike, the different perspectives of various cultural, religious, and racial communities, and the beliefs and practices of First Nations, Métis, and Inuit peoples, to showcase a wide range of backgrounds and allow all of our students to see themselves reflected in the curriculum.

As a school, we see and recognize the diversity of families, children, and people in the world in need of Christ's love. We work every day to spread the love and acceptance of Christ.

Financial Literacy Education

Whenever possible, Christian Virtual School emphasizes the importance of financial literacy. Making financial decisions has become an increasingly complex task, and students need to have knowledge in many areas and a wide range of skills in order to make informed decisions about financial matters. In addition to the concrete skills of numeracy and finances from a mathematical point of view, students need

to develop an understanding of the economic forces and ways in which they can respond to those influences.

Lessons that promote skill building in problem solving, inquiry, research, decision making, reflection, and critical thinking are present throughout Christian Virtual School courses. The goal is to help students acquire the knowledge and skills required to understand their own finances, as well as to develop an understanding of local and global effects of world economic forces and the social, environmental, and ethical implications of their own choices.

The Role of Information and Communication Technology

Technology is rapidly changing, and the requirements for literacy in technology is growing just as quickly. Students entering the workforce are expected to have a firm grasp of information and communication technologies and be skilled their use.

Due to the nature of Christian Virtual School courses, students are exposed to a wide range of technologies to both facilitate and communicate their learning. As a result, students will develop transferable skills through their experience with word processing, information processing, internet research, presentation software, communication tools, and more.

Career Education

Opportunities are present throughout Christian Virtual School courses to explore careers related to the different disciplines and subject areas. Students are exposed to a wide variety of modern careers, fields of study, and employment opportunities.

In addition, teachers are available to help the student prepare for employment in a number of diverse areas. With the help of teachers, students will learn to set and achieve goals and gain experience in making meaningful decisions concerning career choices. The skills, knowledge, and creativity that students acquire through our course are essential for a wide range of careers.

Health and Safety

In order to provide a suitable learning environment for the Christian Virtual School staff and students, it is critical that the courses and the learning environment complies with relevant federal, provincial, and municipal health and safety legislation and by-laws, including, but not limited to, the Workplace Safety and Insurance Act, the Workplace Hazardous Materials Information System (WHMIS), the Food and Drug Act, the Health Protection and Promotion Act, the Ontario Building Code, and the Occupational Health and Safety Act (OHSA).

Consideration of students' health and safety is taken when planning activities, investigations, and experiments for our courses to ensure that proper safety precautions are communicated to and attainable for students.