

Physics, Grade 11, University Preparation

Course Title: Physics

Course Code: SPH3U

Grade: 11

Course Type: University Preparation

Credit Value: 1.0

Prerequisites: SNC2D, Science, Grade 10, Academic

Curriculum Document: [Science, The Ontario Curriculum, Grades 11 and 12, 2008 \(Revised\)](#)

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Department: Science

Development Date: September 2022

Most Recent Revision Date: September 2022

Teacher(s):

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Course Description:

This course develops students' understanding of the basic concepts of physics. Students will explore kinematics, with an emphasis on linear motion; different kinds of forces; energy transformations; the properties of mechanical waves and sound; and electricity and magnetism. They will enhance their scientific investigation skills as they test laws of physics. In addition, they will analyse the interrelationships between physics and technology, and consider the impact of technological applications of physics on society and the environment.

Unit Title and Description	Time Allocated
<p>Kinematics</p> <p>Students will demonstrate an understanding of uniform and non-uniform linear motion, in one and two dimensions. They will investigate, in qualitative and quantitative terms, uniform and non-uniform motion, and solve related problems. They will analyse technologies that apply concepts related to kinematics and assess the technologies' social and environmental impact.</p>	22 Hours
<p>Forces</p> <p>Students will demonstrate an understanding of the relationship between changes in velocity and unbalanced forces in one dimension. They will investigate qualitatively and quantitatively net force, acceleration, and mass; and solve related problems. They will analyse and propose improvements to technologies that apply concepts related to dynamics and Newton's laws and assess the technologies' social and environmental impact.</p>	22 Hours

<p>Energy and Society</p> <p>Students will demonstrate an understanding of work, efficiency, power, gravitational potential energy, kinetic energy, nuclear energy, and thermal energy and its transfer as heat. They will investigate energy transformations and the law of conservation of energy and solve related problems. They will analyse technologies that apply principles of, and concepts related to energy transformations, and assess the technologies' social and environmental impact.</p>	21 Hours
<p>Waves and Sound</p> <p>Students will demonstrate an understanding of the properties of mechanical waves and sound and of the principles underlying their production, transmission, interaction, and reception. They will investigate the properties of mechanical waves and sound and solve related problems. They will analyse how mechanical waves and sound affect technology, structures, society, and the environment, and assess ways of reducing their negative side effects.</p>	21 Hours
<p>Electricity and Magnetism</p> <p>Students will demonstrate an understanding of the properties of magnetic fields, the principles of current and electron flow, and the operation of selected technologies that use the properties and principles to produce and transmit electrical energy. They will investigate magnetic fields and electric circuits and solve related problems. They will analyse the social, economic and environmental impact of electrical energy production and technologies related to electromagnetism and propose ways to improve the sustainability of electrical energy production.</p>	21 Hours
<p>Final Assessment</p> <p>This exam is worth 30% of the final grade.</p>	3 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, analysing and interpreting, and communicating);
2. identify and describe careers related to the fields of science under study, and describe the contributions of scientists, including Canadians, to those fields.

Kinematics

1. analyse technologies that apply concepts related to kinematics, and assess the technologies' social and environmental impact;
2. investigate, in qualitative and quantitative terms, uniform and non-uniform linear motion, and solve related problems;
3. demonstrate an understanding of uniform and non-uniform linear motion, in one and two dimensions.

Forces

1. analyse and propose improvements to technologies that apply concepts related to dynamics and Newton's laws, and assess the technologies' social and environmental impact;
2. investigate, in qualitative and quantitative terms, net force, acceleration, and mass, and solve related problems;
3. demonstrate an understanding of the relationship between changes in velocity and unbalanced forces in one dimension.

Energy and Society

1. analyse technologies that apply principles of and concepts related to energy transformations, and assess the technologies' social and environmental impact;
2. investigate energy transformations and the law of conservation of energy, and solve related problems;
3. demonstrate an understanding of work, efficiency, power, gravitational potential energy, kinetic energy, nuclear energy, and thermal energy and its transfer (heat).

Waves and Sound

1. analyse how mechanical waves and sound affect technology, structures, society, and the environment, and assess ways of reducing their negative effects;
2. investigate, in qualitative and quantitative terms, the properties of mechanical waves and sound, and solve related problems;
3. demonstrate an understanding of the properties of mechanical waves and sound and of the principles underlying their production, transmission, interaction, and reception.

Electricity and Magnetism

1. analyse the social, economic, and environmental impact of electrical energy production and technologies related to electromagnetism, and propose ways to improve the sustainability of electrical energy production;
2. investigate, in qualitative and quantitative terms, magnetic fields and electric circuits, and solve related problems;
3. demonstrate an understanding of the properties of magnetic fields, the principles of current and electron flow, and the operation of selected technologies that use these properties and principles to produce and transmit electrical energy.

Resources Required:

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

- A scanner, smart phone camera, or similar device to digitize handwritten or hand-drawn work,
- A non-programmable, non-graphing, scientific calculator.

Teaching and Learning Strategies:

Teaching and learning strategies assist both teachers and students in achieving specific learning objectives. Several 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
- 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

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 core values: responsibility, perseverance, integrity, compassion, and community. These core values determine our business operations, as well as exemplify what we, as educators, 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.