Thames Valley District School Board

London Central Secondary School
Course Outline 2019/2020

Course Name: Physics, Grade 11	**Course Code:** SPH 3U	**Course Pre-requisite:** SNC 2D
Course Type: University Preparation	**Grade Level:** 11	**Credit Value:** 1
Textbook: Physics 11	**Publisher:** Nelson	**Textbook Value:** $ 106.92
Teachers: C. Janzen and P. Webb		

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.

Link 11-12 Science - http://www.edu.gov.on.ca/eng/curriculum/secondary/2009science11_12.pdf

Course Overall Expectations:

Strand	Overall Expectations
Scientific Investigation Skills and Career Exploration	**As a component of every strand:** • 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); • 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.
Kinematics	• analyse technologies that apply concepts related to kinematics, and assess the technologies' social and environmental impact; • investigate, in qualitative and quantitative terms, uniform and non-uniform linear motion, and solve related problems; • demonstrate an understanding of uniform and non-uniform linear motion, in one and two dimensions.
Forces	• analyse and propose improvements to technologies that apply concepts related to dynamics and Newton's laws, and assess the technologies' social and environmental impact; • investigate, in qualitative and quantitative terms, net force, acceleration, and mass, and solve related problems; • demonstrate an understanding of the relationship between changes in velocity and unbalanced forces in one dimension.
Energy and Society	• analyse technologies that apply principles of and concepts related to energy transformations, and assess the technologies' social and environmental impact; • investigate energy transformations and the law of conservation of energy, and solve related problems; • demonstrate an understanding of work, efficiency, power, gravitational potential energy, kinetic energy, nuclear energy, and thermal energy and its transfer (heat).
Waves and Sound	• analyse how mechanical waves and sound affect technology, structures, society, and the environment, and assess ways of reducing their negative effects; • investigate, in qualitative and quantitative terms, the properties of mechanical waves and sound, and solve related problems; • 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	• 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; • investigate, in qualitative and quantitative terms, magnetic fields and electric circuits, and solve related problems; • 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.

Assessment and Evaluation Strategies:

The purpose of assessment and evaluation is to improve student learning. Assessment and evaluation is based on the provincial curriculum expectations and the achievement levels outlined in the curriculum document. In order to ensure that assessment and evaluation are valid and reliable, and that they lead to the improvement of student learning, teachers use a variety of strategies throughout the course, including: providing students with feedback about their work (known as assessment for learning), helping to set learning goals and monitor their own progress (known as assessment as learning), and evaluation and reporting of progress in the form of grades and marks (known as assessment of learning).

Unit Overview Students will work with related scientific investigation skills and explore scientific careers as part of each unit.	**Assessment and Evaluation Methods** (May include major evaluations)
Kinematics Topics • speed, velocity, and acceleration; distance, position, and displacement; scalar and vector quantities/qualities of uniform and non-uniform linear motion; position–time, velocity–time, and acceleration–time graphs; using graphs to derive equations to solve problems in one dimension; characteristics and examples of projectile motion; and applications and social/environmental impacts of kinematic technology	• assignments, debates, exam, group work, laboratory investigations, presentations, projects, quizzes, reports and tests
Forces Topics • different forces and their effects; theories/discoveries of Galileo and Newton; Newton's laws; use of free-body diagrams and algebraic equations; technology that applies Newton's laws; relationship between the acceleration of an object and its net force; relationships between mass, gravitational field strength, and force of gravity; objects in free fall; and societal/environmental impact of technologies that use principles of force	• assignments, debates, exam, group work, laboratory investigations, presentations, projects, quizzes, reports and tests
Energy and Society Topics • types of energy and transfers/transformations; conservation of mass and energy; interrelationships between energy, work, and power; temperature, specific heat capacity, specific latent heat and power; heating and cooling curves ; efficiency and thermal energy transfer; conditions required for work; using the kinetic molecular theory; conduction, convection, and radiation; nuclear fission, nuclear fusion and common nuclear isotopes; alpha particles, beta particles, and gamma rays; radioactive half-life; societal/environmental impacts of thermal energy transfer/transformation technology; energy input/output efficiency of energy generation methods	• assignments, debates, exam, group work, laboratory investigations, presentations, projects, quizzes, reports and tests
Waves and Sound Topics • longitudinal and transverse waves, resonance; principle of superposition, properties of and conditions required for standing waves, relationship between the speed of sound in various media and the particle nature of the media, the relationship between a moving source of sound and the change in frequency perceived by a stationary observer; natural wave phenomena, structural/technological design influenced by waves, and impact of waves on society and the environment and attempts to reduce that impact	• assignments, debates, group work, laboratory investigations, presentations, projects, quizzes, reports and tests
Electricity and Magnetism Topics • characteristics/properties of magnetic fields; magnetic field direction; conventional current and electron flow; Ohm's law, Kirchhoff's laws, Oersted's principle, motor principle, Faraday's law, and Lenz's law; current, potential difference and resistance of series, parallel, and mixed circuits; production and interaction of magnetic fields; components and operation of an electric motor and a generator; alternating current and direct current; components and operation of transformers; electrical safety precautions; social/economic impact of electromagnetism technologies and efficiency/environmental impact of electrical energy production	• assignments, debates, group work, laboratory investigations, presentations, projects, quizzes, reports and tests
Course Culminating Activity/Independent Study • Motion Investigation and Analysis • Engineering/Force Performance Task and Analysis • Circuit Performance Task and Analysis	• at the conclusion of all the required strands
Exam	• written exam in January

Assessment and Evaluation Categories and Weights:

Achievement Chart Categories	
Term Achievement Category	**Comprises**
Application/Making Connections	• transfer of concepts between self and science • transfer of concepts between science and other subjects • transfer of concepts between subjects and the world outside • access impacts of science
Communication	• oral, writing, listening and visual skills • mathematical/data communication, presentation and precision/accuracy • journals, portfolios and models
Knowledge/Understanding	• facts, terms and relationships between concepts • transfer of concepts to new contexts • solving math/formula problems
Thinking/Inquiry	• design skills (formulate hypotheses, create and test procedures) • thinking skills (inductive reasoning, deductive reasoning and data analysis, interpretation and evaluation)

Evaluation/Weight of Marks			
Evaluation	**Components**	**Component Percentage**	**Overall Percentage**
Term Evaluation	Application/Making Connections	25	**70**
	Communication	25	
	Knowledge/Understanding	25	
	Thinking/Inquiry	25	
Final Evaluation	Culminating Activity	10	**30**
	Exam	20	

Learning Skills and Work Habits Assessment:

The development of learning skills and work habits is an integral part of student learning. These skills are:

- Responsibility
- Organization
- Independent Work
- Collaboration
- Initiative
- Self-Regulation

Learning skills and work habits influence student achievement and are included as a formal part of the assessment and evaluation process. Learning skills and work habits will be assessed through a variety of teacher strategies. (e.g. observation, student /teacher conference, self-reflection, checklists, exit cards, etc.) These important learning skills and work habits will be formally reported on the Provincial Report Card according to the following scale: E- Excellent, G- Good, S- Satisfactory, N- Needs Improvement.

Academic Dishonesty - Cheating and Plagiarism:

Learning tasks that students complete as well as the assignments, tests and exams that students submit for evaluation must be their own work. Cheating and plagiarism is a serious offence that will not be condoned. Academic consequences will result.

Late and Missed Assignments - Student Roles and Responsibilities - Students are expected to:

- be responsible for providing evidence of their achievement of the overall expectations within the time frame specified by the teacher, and in a form approved by the teacher;
- understand that there will be consequences for not completing assignments for evaluation and/or for submitting those assignments late;
- use class time productively;
- in extenuating circumstances, request an extension from the teacher before the due date.

Mark deductions for late and missed assignments may apply to **major assignments only**.

References: *TVDSB Assessment & Evaluation Policy, September 2011; Growing Success - Assessment and Evaluation, and Reporting in Ontario Schools, 2010. Student Planner and School Web site*