Key Changes

Grade 9 Science, De-streamed (SNC1W)

SNC1W (2022)	SNC1D/SNC1P (2008)	KEY CHANGES
Curriculum Context	**Curriculum Context**	

• Introduction
  ○ Preface
  ○ Vision and Goals of the Grade 9 Science Course
  ○ The Importance of STEM Education
  ○ Curiosity and Wonder in Science
	• Introduction
	  ○ Secondary Schools for the 21st Century
	  ○ The Place of Science in the Curriculum
	  ○ The Goals of the Science Program
	  ○ The Nature of Science
	  ○ Roles and Responsibilities in the Science Program
		• A focus on the importance of STEM education and fostering curiosity and wonder in science

• The Program in Science
  ○ Overview
  ○ Courses in Science, Grades 9 to 12
  ○ Curriculum Expectations
  ○ Fundamental Concepts and "Big Ideas" in Science
  ○ The Strands and Topics in the Grade 9 Science Course
  ○ Scientific and Engineering Design Processes
	• The Program in Science
	  ○ Overview of the Program
	  ○ Curriculum Expectations
	  ○ Strands in the Grade 9 and 10 Science Curriculum
	  ○ Skills of Scientific Investigation (Inquiry and Research)
		• Investigation in science now includes engineering design process, in addition to scientific research and experimentation processes.

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• Program Planning and Cross-Curricular and Integrated Learning in Science
  ○ Instructional Approaches in Science
  ○ Health and Safety in Science Education
  ○ Coding and the Impact of Emerging Technologies
  ○ Skilled Trades
  ○ Climate Change
	• Some Considerations for Program Planning
	  ○ Instructional Approaches
	  ○ Health and Safety in Science
	  ○ Planning Science Programs for Students with Special Education Needs
	  ○ Program Considerations for English Language Learners
	  ○ Environmental Education
	  ○ Antidiscrimination Education
	  ○ Critical Thinking and Critical Literacy in Science
	  ○ Literacy, Mathematical Literacy, and Investigation (Inquiry/Research) Skills
	  ○ The Role of Information and Communications Technology in Science
	  ○ The Ontario Skills Passport and Essential
	  ○ Career Education
	  ○ Cooperative Education and Other Forms of Experiential
	  ○ Planning Program Pathways and Programs Leading to a Specialist High Skills Major
		• Supporting new learning on coding, the impacts of emerging technology, skilled trades, and climate change
		
		• In addition to the considerations outlined in the curriculum context, all of the general "Program Planning" sections on the Curriculum and Resources website apply to this course, including:
		  ○ Environmental Education
		  ○ Experiential Learning
		  ○ Human Rights, Equity, and Inclusive Education
		  ○ Indigenous Education
		  ○ Planning for English Language Learners
		  ○ Planning for Students with Special Education Needs
		  ○ Transferable Skills

• Assessment and Evaluation of Student Achievement	• Assessment and Evaluation of Student Achievement
	  ○ Basic considerations
	  ○ The Achievement Chart for Science
		• Supports educators in designing and implementing culturally responsive and relevant assessment and evaluation strategies

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○ Culturally Responsive and Relevant Assessment and Evaluation in Science ○ The Achievement Chart for Grade 9 Science	○ Evaluation and Reporting of Student Achievement ○ Reporting on Demonstrated Learning Skills	
The Goals of the Science Course	**The Goals of the Science Program**	
The three goals of the science program are as follows: 1. to develop the skills and make the connections needed for scientific investigation 2. to relate science to our changing world, including technology, society, the economy, and the environment 3. to investigate and understand scientific concepts Achieving these three goals will enable students to develop a high degree of scientific literacy.	The three goals of the science program are as follows: 1. to relate science to technology, society, and the environment 2. to develop the skills, strategies, and habits of mind required for scientific inquiry 3. to understand the basic concepts of science	• A focus on connecting science to a changing world including the economy, in addition to connecting to technology, society, and the environment • Integrated approach to developing scientific literacy

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Strand A: STEM Skills, Careers, and Connections	**Strand A: Scientific Investigation Skills and Career Exploration**	**Strand A: Scientific Investigation Skills and Career Exploration**	The learning related to this strand takes place in the context of learning in the Biology, Chemistry, Physics, and Earth and Space Science strands.
STEM Investigation Skills	**Scientific Investigation Skills**	**Scientific Investigation Skills**	
A1. apply scientific processes and an engineering design process in their investigations to develop a conceptual understanding of the science they are learning, and apply coding skills to model scientific concepts and relationships	**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)**	**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)**	
A1.1 apply a scientific research process and associated skills, making connections between their research and the scientific concepts they are learning	**A1.1 – A1.13**	**A1.1 – A1.13**	The learning related to Scientific Investigation Skills from **A1.1 – A1.13** has been included in the scientific research and scientific experimentation. Students will continue to engage in a scientific research and scientific experimentation throughout the course as they investigate scientific concepts. These processes are

SNC1W (2022)	SNC1D (2008)	SNC1P (2008)	NEW KEY LEARNING
			further explained in the curriculum context.
A1.2 apply a scientific experimentation process and associated skills to conduct investigations, making connections between their observations and findings and the scientific concepts they are learning			Students will use an engineering design process (EDP), which provides a framework for students and teachers as they plan and build solutions to problems or develop ways to address needs that connect to the curriculum and the world around them.
A1.3 apply an engineering design process and associated skills to design, build, and test devices, models, structures, and/or systems			Building on their learning in elementary mathematics and elementary science and technology, students will apply their coding skills to learn and model scientific concepts and relationships.
A1.4 apply coding skills to investigate and to model scientific concepts and relationships			
A1.5 apply their knowledge and understanding of safe practices and procedures, including the Workplace Hazardous Materials Information System (WHMIS), while	**A1.4** apply knowledge and understanding of safe practices and procedures when planning investigations, with the aid of appropriate support materials	**A1.4** apply knowledge and understanding of safe practices and procedures when planning investigations, with the aid of appropriate support materials	

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planning and carrying out hands-on investigations			
Applications, Careers, and Connections	**Career Exploration**	**Career Exploration**	
A2. analyse how scientific concepts and processes can be applied in practical ways to address real-world issues and in various careers, and describe contributions to science from people with diverse lived experiences	**A2. 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**	**A2. 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**	Students will apply and connect their learning in science to real-world issues and careers. They will also explore contributions to science from people with diverse lived experiences.
A2.1 design an experiment or prototype to explore a problem relevant to a STEM-related occupation, such as a skilled trade, using findings from research	**A2.1** identify and describe a variety of careers related to the fields of science under study and the education and training necessary for these careers	**A2.1** identify and describe a variety of careers related to the fields of science under study and the education and training necessary for these careers	Building on the learning from the revised Elementary Science and Technology curriculum (2022), students in Grade 9 make connections between the science they are learning and STEM-related careers, including skilled trades, by engaging in hands-on experimentation and engineering design.
A2.2 describe how scientific innovations and emerging technologies, including artificial			Students will have opportunities to explore the impacts of scientific innovations and emerging

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intelligence systems, impact society and careers			technologies, including artificial intelligence systems, on society and careers.
A2.3 analyse how the development and application of science is economically, culturally, and socially contextualized, by investigating real-world issues			Students will have an opportunity to investigate and analyse the ways in which scientific development and application is contextualized by economic, cultural, and social factors.
A2.4 apply scientific literacy skills when investigating social and environmental issues that have personal, local, and/or global impacts			Students will develop scientific literacy skills throughout this course.
A2.5 analyse contributions to science by people from various communities, including communities in Canada	**A2.2** identify scientists, including Canadians, who have made a contribution to the fields of science under study	**A2.2** identify scientists, including Canadians, who have made a contribution to the fields of science under study	Students will analyse the contributions to science by people from various communities.

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Strand B: Biology Sustainable Ecosystems and Climate Change	**Strand B: Biology Sustainable Ecosystems**	**Strand B: Biology Sustainable Ecosystems and Human Activity**	The learning expectations in the Biology strand are to be paired with the learning and skills in Strand A.
Relating Science to Our Changing World	**Relating Science to Technology, Society, and the Environment**	**Relating Science to Technology, Society, and the Environment**	
B1. assess impacts of climate change on ecosystem sustainability and on various communities, and describe ways to mitigate these impacts	**B1. 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**	**B1. analyse the impact of human activity on terrestrial or aquatic ecosystems, and assess the effectiveness of selected initiatives related to environmental sustainability**	
B1.1 assess impacts of climate change on the sustainability of local and global ecosystems, describe local and global initiatives for combatting climate change, and identify solutions to address some of the impacts	**B1.1** assess, on the basis of research, the impact of a factor related to human activity that threatens the sustainability of a terrestrial or aquatic ecosystem	**B1.1** analyse, on the basis of research, how a human activity threatens the sustainability of a terrestrial or aquatic ecosystem	Students will learn about climate change, its impacts on local and global ecosystems, and initiatives for combatting climate change.
*Incorporated into **B1.2***	**B1.2** evaluate the effectiveness of government initiatives in Canada (federal, provincial, municipal),	**B1.2** assess the effectiveness of a local initiative of personal interest that seeks to ensure the	

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	and/or the efforts of societal groups or non-governmental organizations, such as Aboriginal communities, environmental groups, or student organizations, with respect to an environmental issue that affects the sustainability of terrestrial or aquatic ecosystems	sustainability of a terrestrial or aquatic ecosystem, and explain why the initiative is important to the sustainability of the ecosystem	
B1.2 assess impacts of climate change on communities in Canada, including First Nations, Métis, and Inuit communities			Students will have an opportunity to investigate the ways in which communities in Canada, including First Nations, Métis, and Inuit communities, are impacted by climate change.
B1.3 investigate and explain how sustainable practices used by various communities, including First Nations, Métis, and Inuit communities, reflect an understanding of the importance of the dynamic equilibrium of ecosystems			Students will connect their understanding of the importance of maintaining a dynamic equilibrium to the sustainable practices developed and used by various communities, including by First Nations, Métis, and Inuit communities.

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	Developing Skills of Investigation and Communication	**Developing Skills of Investigation and Communication**	
*Incorporated into **B2** and Strand A*	**B2. investigate factors related to human activity that affect terrestrial and aquatic ecosystems, and explain how they affect the sustainability of these ecosystems**	**B2. investigate some factors related to human activity that affect terrestrial or aquatic ecosystems, and describe the consequences that these factors have for the sustainability of these ecosystems**	
Investigating and Understanding Concepts	**Understanding Basic Concepts**	**Understanding Basic Concepts**	
B2. demonstrate an understanding of the dynamic and interconnected nature of ecosystems, including how matter cycles and energy flows through ecosystems	**B3. 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**	**B3. demonstrate an understanding of characteristics of terrestrial and aquatic ecosystems, the interdependence within and between ecosystems, and the impact humans have on the sustainability of these ecosystems**	
*Moved to Grade 7 **B2.2***	**B3.1** compare and contrast biotic and abiotic characteristics of	**B3.1** identify similarities and differences between terrestrial and aquatic ecosystems, and describe	

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	sustainable and unsustainable terrestrial and aquatic ecosystems	these similarities and differences using diagrams	
Moved to Grade 7 ***B2.1***		**B3.2** describe the interdependence of the components within a terrestrial and an aquatic ecosystem, and explain how the components of both systems work together to ensure the sustainability of a larger ecosystem	
B2.1 investigate interactions between the biosphere, hydrosphere, lithosphere, and atmosphere, and explain why these relationships are important for ecosystem sustainability	**B3.4** Identify the earth's four spheres (biosphere, hydrosphere, lithosphere, atmosphere), and describe the relationship that must exist between these spheres if diversity and sustainability are to be maintained		
B2.2 explain how naturally occurring phenomena, including the cycling of matter and the flow of energy, contribute to the dynamic equilibrium within and between ecosystems			Students will further develop their understanding of processes that contribute to maintaining a dynamic equilibrium in ecosystems, including how matter cycles and how energy flows through ecosystems.
B2.3 compare and contrast the processes of cellular respiration	**B3.2** describe the complementary processes of cellular respiration	**B3.3** describe the complementary processes of cellular respiration	

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and photosynthesis, and explain how their complementary relationship contributes to the dynamic equilibrium of ecosystems	and photosynthesis with respect to the flow of energy and the cycling of matter within ecosystems and explain how human activities can disrupt the balance achieved by these processes	and photosynthesis with respect to the flow of energy and the cycling of matter within ecosystems, and explain how human activities can disrupt the balance achieved by these processes	
Moved to Grade 7 ***B2.7***	**B3.3** describe the limiting factors of ecosystems, and explain how these factors affect the carrying capacity of an ecosystem	**B3.4** identify the major limiting factors of ecosystems, and explain how these factors are related to the carrying capacity of an ecosystem	
B2.4 investigate factors and processes, including biodiversity, air and water quality, soil health, and succession, and explain how they contribute to ecosystem sustainability	**B2.3** plan and conduct an investigation, involving both inquiry and research, into how a human activity affects soil composition or soil fertility	**B2.2** investigate the characteristics and interactions of biotic and abiotic components of a terrestrial or aquatic ecosystem, and describe the importance of these components in a sustainable ecosystem	Building on food literacy learning in elementary science and technology, students will have an opportunity to learn about the many factors that contribute to ecosystem sustainability, including soil health, air and water quality, biodiversity, and succession.
B2.5 explain the effects of various human activities on the dynamic equilibrium of ecosystems	**B3.5** identify various factors related to human activity that have an impact on ecosystems, and explain how these factors affect the equilibrium and survival of ecosystems	**B3.5** identify some factors related to human activity that have an impact on ecosystems, and explain how these factors affect the equilibrium and survival of populations in terrestrial and aquatic ecosystems	

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B2.6 identify and use various indicators of climate change to describe the impacts of climate change on local and global ecosystems, and analyse how human activities contribute to climate change			Building on climate change learning in elementary science and technology, students will be learning about climate change indicators, how climate change affects ecosystems, and how human activities contribute to climate change.
B2.7 explain how sustainable practices related to the cycling of matter and the flow of energy can be applied in agricultural innovations			Students will connect to learning sustainable practices used by various communities from **B1.3** and investigate how these practices can be applied in agricultural innovations.
Strand C: Chemistry Nature of Matter	**Strand C: Chemistry Atoms, Elements, And Compounds**	**Strand C: Chemistry Exploring Matter**	The learning expectations in the Chemistry strand are to be paired with the learning and skills in Strand A.
Relating Science to Our Changing World	**Relating Science to Technology, Society, and the Environment**	**Relating Science to Technology, Society, and the Environment**	
C1. assess social, environmental, and economic impacts of the use	**C1. assess social, environmental, and economic impacts of the use of common elements and**	**C1. analyse how properties of common elements and/or simple compounds affect their use, and**	

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of elements, compounds, and associated technologies	**compounds, with reference to their physical and chemical properties**	**assess the social and environmental impact associated with their production or use**	
C1.1 assess social, environmental, and economic impacts of processes associated with the life cycle of consumer products, considering the elements and compounds used to make them, and suggest ways to enhance positive impacts and/or minimize negative impacts	**C1.2** assess social, environmental, and economic impacts of the use of common elements or compounds	**C1.2** assess the social and environmental impact of the production or use of a common element or simple compound	Students will connect learning about elements and compounds to a real-world example that they can relate to: the use, production, and disposal of consumer products, and the impacts of these processes.
Incorporated into ***C1.1***	**C1.1** assess the usefulness of and/or the hazards associated with common elements or compounds in terms of their physical and chemical properties	**C1.1** analyse how the chemical and physical properties of common elements and/or simple compounds affect the use of everyday materials that contain those elements and/or compounds	
C1.2 analyse impacts of using emerging chemical technologies in various fields, including skilled trades, and assess factors that influence the development of these technologies			Building on learning about emerging technologies and their impacts, students will investigate and analyse emerging chemical technologies in various fields and the factors that influence their development.

SNC1W (2022)	SNC1D (2008)	SNC1P (2008)	NEW KEY LEARNING
	Developing Skills of Investigation and Communication	**Developing Skills of Investigation and Communication**	
*Incorporated into **C2** and Strand A*	**C2. investigate, through inquiry, the physical and chemical properties of common elements and compounds**	**C2. investigate, through inquiry, physical and chemical properties of common elements and simple compounds**	
Investigating and Understanding Concepts	**Understanding Basic Concepts**	**Understanding Basic Concepts**	
C2. demonstrate an understanding of the nature of matter, including the structure of the atom, physical and chemical properties of common elements and compounds, and the organization of elements in the periodic table	**C3. demonstrate an understanding of the properties of common elements and compounds, and of the organization of elements in the periodic table**	**C3. demonstrate an understanding of the properties of common elements and simple compounds, and general features of the organization of the periodic table**	
C2.1 investigate properties, changes, and interactions of matter that are important for the dynamic equilibrium of ecosystems and their sustainability			Students will make connections to learning in *Strand B* (Biology) as they investigate chemistry in the environment.

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C2.2 research the role of experimental evidence in the development of various atomic models, and compare and contrast different models of the atom	**C3.1** explain how different atomic models evolved as a result of experimental evidence		
C2.3 identify the location, relative mass, and charge of subatomic particles within an atom, using the Bohr-Rutherford model	**C3.2** describe the characteristics of neutrons, protons, and electrons, including charge, location, and relative mass	**C3.1** identify the characteristics of neutrons, protons, and electrons, including charge, location, and relative mass	
Moved to Grade 7	**C3.3** distinguish between elements and compounds	**C3.2** describe the characteristics that distinguish elements from compounds	
*Incorporated into **C2.6***	**C3.4** describe the characteristic physical and chemical properties of common elements and compounds	**C3.4** explain the relationships between the properties of elements and their position in the periodic table	
*Incorporated into **C2.5***	**C3.5** describe patterns in the arrangements of electrons in the first 20 elements of the periodic table, using the Bohr-Rutherford model		
C2.4 explain the relationship between the position of an element in the periodic table and	**C3.6** explain the relationship between the atomic structure of an	**C3.3** identify general features of the periodic table	

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the structure of its atoms, using models	element and the position of that element in the periodic table		
C2.5 investigate the physical and chemical properties of elements, and use their findings to relate these properties to the organization of the periodic table, classify elements, and identify patterns in the periodic table	**C3.7** compare and contrast the physical properties of elements within a group and between groups in the periodic table	**C3.5** describe the characteristic physical and chemical properties of common elements	
C2.6 investigate and describe physical and chemical properties of elements and compounds, including those that make up common household products		**C3.7** identify the elements and compounds in common household products	
C2.7 describe the relationship between the structure of simple compounds and their chemical formulas	**C3.8** identify and use the symbols for common elements and the formulae for common compounds	**C3.6** use symbols and chemical formulae to represent common elements and simple compounds	

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Strand D: Physics Principles and Applications of Electricity	**Strand E: Physics The Characteristics of Electricity**	**Strand E: Physics Electrical Applications**	The learning expectations in the Physics strand are to be paired with the learning and skills in Strand A.
Relating Science to Our Changing World	**Relating Science to Technology, Society, and the Environment**	**Relating Science to Technology, Society, and the Environment**	
D1. assess social, environmental, and economic impacts of electrical energy production and consumption, and describe ways to achieve sustainable practices	**E1. 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**	**E1. assess the major social, economic, and environmental costs and benefits of using electrical energy, distinguishing between renewable and non-renewable sources, and propose a plan of action to reduce energy costs**	
Incorporated into Strand A	**E1.1** analyse the design of a technological device that improves its electrical efficiency or protects other devices by using or controlling static electricity		
D1.1 assess social, environmental, and economic benefits and challenges resulting from the	**E1.2** assess some of the social, economic, and environmental implications of the production of	**E1.1** assess social, economic, and environmental costs and benefits of using a renewable and a non-	

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production of electrical energy from various sources	electrical energy in Canada from renewable and non-renewable sources	renewable source of electrical energy, taking the issue of sustainability into account	
D1.2 evaluate how electrical energy production and consumption impact various communities locally or globally, and describe ways to achieve sustainable practices			Students will connect learning to *Strand B* (Biology) and investigate the impacts of energy production and consumption on communities, as well as sustainable practices.
D1.3 develop a plan of action to address a local or global electrical energy production or consumption issue, including strategies for energy conservation	**E1.3** produce a plan of action to reduce electrical energy consumption at home, and outline the roles and responsibilities of various groups	**E1.2** propose a plan of action to decrease household energy costs by applying their knowledge of the energy consumption of different types of appliances	
D1.4 analyse social, environmental, and economic impacts of emerging technologies related to electrical energy production, consumption, storage, and conservation			Building on learning about emerging technologies and their impacts, students will investigate and analyse the impacts of emerging technologies related to electrical energy production, consumption, storage, and conservation.

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	Developing Skills of Investigation and Communication	**Developing Skills of Investigation and Communication**	
*Incorporated into **D2** and Strand A*	**E2. 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**	**E2. investigate, through inquiry, the properties of static and current electricity and the cost of the consumption of electrical energy**	
Investigating and Understanding Concepts	**Understanding Basic Concepts**	**Understanding Basic Concepts**	
D2. demonstrate an understanding of the nature of electric charges, including properties of static and current electricity	**E3. demonstrate an understanding of the principles of static and current electricity supports these theories**	**E3. demonstrate an understanding of the concepts and principles of static and current electricity**	
D2.1 conduct investigations to explain the behaviour of electric charges in static and current electricity, and to relate the observed behaviour to the properties of subatomic particles and atomic structure		**E3.2** explain the law of electric charges with reference to common electrostatic phenomena	Students will make connections to learning in *Strand C* (Chemistry) as they investigate the behaviour of electric charges.

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D2.2 determine the conductivity of various materials by investigating their ability to hold or transfer electric charges	**E3.2**explain the characteristics of conductors and insulators and how materials allow static charge to build up or be discharged	**E3.1** compare conductors and insulators, and explain how materials allow static charge to build up or be discharged	
D2.3 identify the components of a direct current (DC) circuit and explain their functions, and identify electrical quantities, their symbols, and their corresponding International System of Units (SI) units	**E3.1**identify electrical quantities (i.e., current, potential difference, resistance, and electrical energy), and list their symbols and their corresponding SI units		
*Incorporated into **D2.3***	**E3.3** compare and contrast static electricity with alternating current (AC) and direct current (DC)	**E3.3**identify the components of a simple direct current (DC) electrical circuit, and describe their functions	
*Incorporated into **D2.3***	**E3.4** Identify the components of a simple DC circuit, and explain their functions	**E3.4** Identify electrical quantities and their symbols, and explain how they are measured using an ammeter, a voltmeter, and a multimeter	
D2.4 investigate the relationships between electric current, potential difference, and resistance in electrical circuits, and develop a mathematical model to represent the relationships	**E3.6** describe, qualitatively, the interrelationships between resistance, potential difference, and electric current	**E3.6** describe, qualitatively, the interrelationships between resistance, potential difference, and electric current, in a series circuit	Students will use their observations and findings from hands-on investigations to develop a mathematical model to represent the relationship between electric

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			current, potential difference, and resistance.
D2.5 apply a mathematical model to calculate electric current, potential difference, and resistance in real-world situations	**E2.8** solve simple problems involving potential difference V, electric current I, and resistance R, using the quantitative relationship V = IR		
D2.6 construct series and parallel circuits to compare electric current, potential difference, and resistance in both types of circuits	**E3.5** explain the characteristics of electric current, potential difference, and resistance in simple series and parallel circuits, noting how the quantities differ in the two circuits	**E3.5** explain the characteristics of electric current, potential difference, and resistance, in simple series and parallel circuits	
D2.7 explain the difference between electricity and electrical energy			Students will differentiate between electricity and electrical energy.
D2.8 determine the efficiency of various electrical devices that consume or produce electrical energy, and identify the energy transformations in each device	**E2.10** calculate the efficiency of an energy converter, using the following equation: percent efficiency = (Eout/Ein) x 100%		
*Incorporated into **D2.6***	**E3.7** explain what different meters measure and how they are connected within an electrical		

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	circuit to measure electrical quantities		
*To be incorporated into pedagogical supports for **D2.6***	**E3.8** Explain how various factors influence the resistance of an electrical circuit	**E3.7** Explain the practical use of resistance in a common household product	
Strand E: Earth and Space Science **Space Exploration**	**Strand D: Earth and Space Science** **The Study of the Universe**	**Strand D: Earth and Space Science** **Space Exploration**	The learning expectations in this Earth and Space Science strand are to be paired with the learning and skills in Strand A.
Relating Science to Our Changing World	**Relating Science to Technology, Society, and the Environment**	**Relating Science to Technology, Society, and the Environment**	
E1. evaluate social, environmental, and economic impacts of space exploration and of technological innovations derived from space exploration	**D1. assess some of the costs, hazards, and benefits of space exploration and the contributions of Canadians to space research and technology**	**D1. analyse the major challenges and benefits of space exploration, and assess the contributions of Canadians to space exploration**	
Incorporated into Strand A	**D1.1** assess, on the basis of research, and report on the contributions of Canadian governments, organizations, businesses, and/or individuals to	**D1.2** assess the contributions of Canadians to space exploration	Students will learn about the contributions to science by people from various communities, including communities in Canada, throughout the course.

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	space technology, research, and/or exploration		
E1.1 evaluate social, environmental, and economic impacts of space observation and exploration		**D1.1** research the challenges associated with space exploration, and explain the purpose of materials and technologies that were developed to address these challenges and how these materials and technologies are now used in other fields of endeavour	
E1.2 evaluate how space observation and exploration technologies contribute to our understanding of climate change, natural disasters, and other phenomena	**D1.2** assess some of the costs, hazards, and benefits of space exploration, taking into account the benefits of technologies that were developed for the space program but that can be used to address environmental and other practical challenges on Earth		Students will connect to learning in *Strand B* (Biology) by understanding how space exploration technology can be used to understand various phenomena on Earth, including climate change and natural disasters.
E1.3 assess ways in which technological innovations related to space observation and exploration are applied in various fields, including their contributions to sustainable practices on Earth			Students will connect to learning in *Strand B* (Biology) and explore various STEM fields that utilize technological innovations related to space exploration and observation.

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	Understanding Basic Concepts	**Understanding Basic Concepts**	
*Incorporated into **E2** and Strand A*	**D2. investigate the characteristics and properties of a variety of celestial objects visible from Earth in the night sky**	**D2. investigate the properties of different types of celestial objects in the solar system and the universe**	
Investigating and Understanding Concepts	**Understanding Basic Concepts**	**Understanding Basic Concepts**	
E2. demonstrate an understanding of the components, characteristics, and associated phenomena of the solar system and the universe, and the importance of the Sun to processes on Earth	**D3. 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**	**D3. demonstrate an understanding of major astronomical phenomena and of the principal components of the solar system and the universe**	
E2.1 describe the importance of the Sun and its characteristics, including its role in the solar system and in sustaining life on Earth	**D3.4** describe the sun's composition and energy source, and explain how its energy warms Earth and supports life on the planet	**D3.4** describe the characteristics of the sun and the effects of its energy on Earth and Earth's atmosphere	

SNC1W (2022)	SNC1D (2008)	SNC1P (2008)	NEW KEY LEARNING
E2.2 explain how the Sun's energy causes natural phenomena on Earth, and how these phenomena contribute to renewable energy production		**D3.3** identify the factors that make Earth well suited for the existence of life	Students will connect learning to Strand B (Biology) and Strand D (Physics) as they investigate renewable energy production.
E2.3 summarize observational evidence used to support theories about the origin and evolution of the universe and the solar system, considering diverse ways of knowing	**D3.1** describe observational and theoretical evidence relating to the origin and evolution of the universe		
*Incorporated into **E2.3***	**D3.2** Describe observational and theoretical evidence relating to the formation of the solar system		
E2.4 describe major components of the solar system and the universe and compare their characteristics	**D3.3** Describe the major components of the solar system and the universe, using appropriate scientific terminology and units	**D3.1** Describe the major components of the universe, the motion of the different types of celestial objects, and the distances between certain objects, using appropriate scientific terminology and units D3.2 Compare the characteristics and properties of celestial objects that constitute the solar system, including their motion and their	

SNC1W (2022)	SNC1D (2008)	SNC1P (2008)	NEW KEY LEARNING
		distance from other celestial objects in the solar system	
E2.5 quantify distances in the solar system and the universe by applying an understanding of relative distances and sizes and using appropriate units of measure			Students will develop an understanding of relative distances and sizes and connect to learning in mathematics.
*Incorporated into **A2.3** and **E2.3***	**D3.6** Describe various reasons that humankind has had for studying space and the conceptions of the universe held by various cultures and civilizations	**D3.6** Describe the role of celestial objects in the traditions and beliefs of selected cultures and civilizations	
E2.6 conduct investigations to explain the causes of various astronomical phenomena that can be observed from Earth	**D3.5** Explain the causes of astronomical phenomena and how various phenomena can best be observed from Earth	**D3.5** Describe the causes of major astronomical phenomena and how various phenomena can best be observed from Earth	