Science Links 9 to Science, Grade 9 Applied (SNC1P)

Note: The curriculum expectations are fundamental to the McGraw-Hill Ryerson Science Links 9 program. Following are some points in the textbook where the curriculum outcomes are addressed. This is not an exhaustive list.

Curriculum Outcome	Reference
A. Scientific Investigation Skills and Career Exploration	
A1. Scientific Investigation Skills	
A1.1 formulate scientific questions about observed relationships, ideas, problems, and/or issues, make predictions, and/or formulate hypotheses to focus inquiries or research	Topic 1.2 How do interactions supply energy to ecosystems? pp. 18–27 Topic 1.4 What natural factors limit the growth of ecosystems? pp. 40–49 Topic 2.1 In what ways do chemicals affect your life? pp. 94–103 Topic 2.2 How do we use properties to help us describe matter? pp. 104–111 Topic 2.4 How are properties of atoms used to organize elements into the periodic table? pp. 120–129 Topic 2.5 In what ways do scientists communicate about elements and compounds? pp. 130–139 Topic 4.2 What are charges and how do they behave? pp. 252–263
A1.2 select appropriate instruments (e.g., soil sampling instruments, a pneumatic trough and test tubes, magnifying lenses, an electroscope) and materials (e.g., ebonite rods, star charts, oxygen testing splints, pH paper) for particular inquiries	Topic 2.3 What are pure substances and how are they classified? pp. 112–119 Topic 4.3 How can objects become charged and discharged? pp. 264–273
A1.3 identify and locate print, electronic, and human sources that are relevant to research questions	Topic 1.5 How do human activities affect ecosystems? pp. 50–62 Topic 1.6 How can our actions promote sustainable ecosystems? pp. 62–77 Topic 3.1 What do we see when we look at the night sky? pp. 68–181 Topic 3.2 What are the Sun and the Moon, and how are they linked to Earth? pp. 182–195 Topic 3.3 What has space exploration taught us about our solar system? pp. 196–207 Topic 3.4 What role does Canada play in space exploration? pp. 208–217 Topic 3.5 How do we benefit from space exploration? pp. 220–229 Topic 4.1 How do the sources used to generate electrical energy compare? pp. 244–251
A1.4 apply knowledge and understanding of safe practices and procedures when planning investigations (e.g., appropriate techniques for handling, storing, and disposing of laboratory materials [following the Workplace Hazardous Materials Information System–WHMIS]; safe operation of electrical equipment; safe handling of biological materials), with the aid of appropriate support materials (e.g., the Reference Manual on the WHMIS website; the Live Safe! Work Smart! website)	Topic 2.1 In what ways to chemicals affect your life? pp. 94–103 Topic 2.2 How do we use properties to help us describe matter? pp. 104–111 Topic 2.3 What are pure substances and how are they classified? pp. 112–119

A1.5 conduct inquiries, controlling some variables, adapting or extending procedures as required, and using standard equipment and materials safely, accurately, and effectively, to collect observations and data	Topic 1.4 What natural factors limit the growth of ecosystems? pp. 40–49 Topic 2.2 How do we use properties to help us describe matter? pp. 104–111 Topic 2.3 What are pure substances and how are they classified? pp. 112–119 Topic 4.3 How can objects become charged and discharged? pp. 264–273 Topic 4.4 How can people control and use the movement of charges? pp. 274–291 Topic 4.5 What are series and parallel circuits and how are they different? pp. 292–303
A1.6 gather data from laboratory and other sources, and organize and record the data using appropriate formats, including tables, flow charts, graphs, and/or diagrams	Topic 3.1 What do we see when we look at the night sky? pp. 68–181 Topic 4.2 What are charges and how do they behave? pp. 252–263 Topic 4.5 What are series and parallel circuits and how are they different? pp. 292–303
A1.7 select, organize, and record relevant information on research topics from various sources, including electronic, print, and/or human sources (e.g., Statistics Canada publications, NASA or EnerGuide websites, personal interviews), using recommended formats and an accepted form of academic documentation	Topic 1.5 How do human activities affect ecosystems? pp. 50–62 Topic 2.3 What are pure substances and how are they classified? pp. 112–119 Topic 2.4 How are properties of atoms used to organize elements into the periodic table? pp. 120–129 Topic 2.5 In what ways do scientists communicate about elements and compounds? pp. 130–139 Topic 3.2 What are the Sun and the Moon, and how are they linked to Earth? pp. 182–195 Topic 3.3 What has space exploration taught us about our solar system? pp. 196–207 Topic 3.5 How do we benefit from space exploration? pp. 220–229
A1.8 analyze and interpret qualitative and/or quantitative data to determine whether the evidence supports or refutes the initial prediction or hypothesis, identifying possible sources of error, bias, or uncertainty	Topic 1.3 How do interactions in ecosystems cycle matter? pp. 28–39 Topic 3.1 What do we see when we look at the night sky? pp. 68–181
A1.9 analyze the information gathered from research sources for reliability and bias	Topic 1.5 How do human activities affect ecosystems? pp. 50–62 Topic 2.1 In what ways do chemicals affect your life? pp. 94–103 Topic 2.2 How do we use properties to help us describe matter? pp. 104–111 Topic 2.5 In what ways do scientists communicate about elements and compounds? pp. 130–139 Topic 4.1 How do the sources used to generate electrical energy compare? pp. 244–251
A1.10 draw conclusions based on inquiry results and research findings, and justify their conclusions	Topic 1.4 What natural factors limit the growth of ecosystems? pp. 40–49 Topic 2.1 In what ways do chemicals affect your life? pp. 94–103 Topic 2.3 What are pure substances and how are they classified? pp. 112–119 Topic 3.1 What do we see when we look at the night sky? pp. 68–181 Topic 3.2 What are the Sun and the Moon, and how are they linked to Earth? pp. 182–195 Topic 3.4 What role does Canada play in space exploration? pp. 208–217 Topic 3.5 How do we benefit from space exploration? pp. 220–229 Topic 4.1 How do the sources used to generate electrical energy compare? pp. 244–251 Topic 4.2 What are charges and how do they behave? pp. 252–263 Topic 4.3 How can objects become charged and discharged? pp. 264–273 Topic 4.4 How can people control and use the movement of charges? pp. 274–291 Topic 4.5 What are series and parallel circuits and how are they different? pp. 292–303

A1.11 communicate ideas, plans, procedures, results, and conclusions orally, in writing, and/or in electronic presentations, using appropriate language and a variety of formats (e.g., data tables, laboratory reports, presentations, debates, simulations, models)	throughout
A1.12 use appropriate numeric, symbolic, and graphic modes of representation, and appropriate units of measurement (e.g., SI and imperial units)	Topic 2.4 How are properties of atoms used to organize elements into the periodic table? pp. 120–129 Topic 3.1 What do we see when we look at the night sky? pp. 68–181 Topic 3.3 What has space exploration taught us about our solar system? pp. 196–207 Topic 4.5 What are series and parallel circuits and how are they different? pp. 292–303 Topic 4.6 What features make an electrical circuit practical and safe? pp. 304–313
A1.13 express the results of any calculations involving data accurately and precisely	Inquiry Investigation 6-C, Neutralizing an Acid with a Base, p. 250 Inquiry Investigation 7-A, Specific Heat Capacity of Earth Materials, p. 300 Inquiry Investigation 11-A, Investigating Refraction, from Air to Water, p. 476 Inquiry Investigation 11-B, Analyzing the Index of Refraction, p. 477 Real World Investigation 11-C, Saving Time, p. 478 Inquiry Investigation 12-A, Image Characteristics of a Converging Lens, p. 512
A2. Career Exploration	
A2.1 identify and describe a variety of careers related to the fields of science under study (e.g., radar satellite technician, fish and wildlife technologist, ceramicist, electrician) and the education and training necessary for these careers	Topic 3.2 What are the Sun and the Moon, and how are they linked to Earth? pp. 182–195 Topic 3.4 What role does Canada play in space exploration? pp. 208–217 Science at Work, pp. 78, 152, 218, 324
A2.2 identify scientists, including Canadians (e.g., Kim Fernie, Robert Ackman, Helen Hogg, Kenneth Hill), who have made a contribution to the fields of science under study	Topic 3.2 What are the Sun and the Moon, and how are they linked to Earth? pp. 182–195 Topic 3.4 What role does Canada play in space exploration? pp. 208–217
B. Biology: Sustainable Ecosystems	
B1. Relating Science to Technology, Society, and the Environment	
B1.1 analyse, on the basis of research, how a human activity (e.g., urban sprawl, use of pesticides and fertilizers, creation of pollution, human interaction with wildlife) threatens the sustainability of a terrestrial or aquatic ecosystem [IP, PR, AI, C]	Topic 1.3 How do interactions in ecosystems cycle matter? pp. 28–39 Topic 1.5 How do human activities affect ecosystems? pp. 50–62
B1.2 assess the effectiveness of a local initiative of a personal interest that seeks to ensure the sustainability of a terrestrial or aquatic ecosystem (e.g., greening their school grounds; conservation efforts of local Aboriginal communities; naturalizing banks of local rivers or ponds with native vegetation; adoption of an integrated pest management strategy to combat pests in a local garden), and explain why the initiative is important to the sustainability of the ecosystem [AI, C]	Topic 1.5 How do human activities affect ecosystems? pp. 50–62 Topic 1.6 How can our actions promote sustainable ecosystems? pp. 62–77

B2. Developing Skills of Investigation and Communication	
B2.1 use appropriate terminology related to sustainable ecosystems, including, but not limited to: *biodiversity, biotic, ecosystem, equilibrium, species diversity, sustainability,* and *watershed* [C]	Topic 1.1 What are ecosystems, and why do we are about them? pp. 8–17 Topic 1.5 How do human activities affect ecosystems? pp. 50–62 Topic 1.6 How can our actions promote sustainable ecosystems? pp. 62–77
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 [PR, AI, C]	Topic 1.1 What are ecosystems, and why do we are about them? pp. 8–17 Topic 1.6 How can our actions promote sustainable ecosystems? pp. 62–77
B2.3 compile and graph qualitative and quantitative data on organisms within an undisturbed or disturbed ecosystem (terrestrial or aquatic) (e.g., nematode and earthworm populations in soil or compost; bird populations during migration or winter feeding; tadpole and mosquito larvae populations in a local pond) [PR, AI, C]	Topic 1.4 What natural factors limit the growth of ecosystems? pp. 40–49
B2.4 plan and conduct an inquiry into how a factor related to human activity affects a terrestrial or aquatic ecosystem (e.g., how changes to soil composition from the use of different compostable materials or organic or inorganic fertilizers affect the types of plants that can be grown; how lower water levels resulting from water diversion affect waterfowl nesting areas and fish reproduction), and describe the consequences that this factor has for the sustainability of the ecosystem [IP, PR, AI, C]	Topic 1.5 How do human activities affect ecosystems? pp. 50–62 Topic 1.6 How can our actions promote sustainable ecosystems? pp. 62–77
B2.5 analyse the effect of factors related to human activity on terrestrial or aquatic ecosystems by interpreting data and generating graphs (e.g., data on the concentration in water of chemicals from fertilizer run-off and their effect on the growth of algae) [AI, C]	Topic 1.5 How do human activities affect ecosystems? pp. 50–62 Topic 1.6 How can our actions promote sustainable ecosystems? pp. 62–77
B3. Understanding Basic Concepts	
B3.1 identify similarities and differences between terrestrial and aquatic ecosystems, and describe these similarities and differences using diagrams	Topic 1.1 What are ecosystems, and why do we are about them? pp. 8–17
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	Topic 1.1 What are ecosystems, and why do we are about them? pp. 8–17 Topic 1.2 How do interactions supply energy to ecosystems? pp. 18–27 Topic 1.3 How do interactions in ecosystems cycle matter? pp. 28–39 Topic 1.4 What natural factors limit the growth of ecosystems? pp. 40–49
B3.3 describe the complementary processes of cellular respiration and photosynthesis with respect to the flow of energy and the cycling of matter within ecosystems (e.g., carbon dioxide is a by-product of cellular respiration and is used for photosynthesis, which produces oxygen needed for cellular respiration), and explain how human activities can disrupt the balance achieved by these processes (e.g., automobile use increases the amount of carbon dioxide in the atmosphere; planting trees reduces the amount of carbon dioxide in the atmosphere)	Topic 1.2 How do interactions supply energy to ecosystems? pp. 18–27 Topic 1.3 How do interactions in ecosystems cycle matter? pp. 28–39

B3.4 identify the major limiting factors of ecosystems (e.g., nutrients, space, water, predators), and explain how these factors are related to the carrying capacity of an ecosystem (e.g., how an increase in the moose population in an ecosystem affects the wolf population in the same ecosystem)	Topic 1.4 What natural factors limit the growth of ecosystems? pp. 40–49
B3.5 identify some factors related to human activity that have an impact on ecosystems (e.g., the use of fertilizers and pesticides; altered shorelines; organic and conventional farming; urban sprawl), and explain how these factors affect equilibrium and survival of populations in terrestrial and aquatic ecosystems (e.g., fertilizers change the fertility of the soil, affecting what types of plants can grow in it; pesticides leach into water systems, affecting water quality and aquatic life; shoreline development affects the types of aquatic life and terrestrial vegetation that can live by lake shores or river banks; urban sprawl wipes out fields and woods, destroying wildlife habitats)	Topic 1.5 How do human activities affect ecosystems? pp. 50–62 Topic 1.6 How can our actions promote sustainable ecosystems? pp. 62–77
C. Chemistry: Atoms, Elements, and Compounds	
C1. Relating Science to Technology, Society, and the Environment	
C1.1 analyse how the chemical and physical properties of common elements and/or simple compounds affect the use of everyday materials that contain these elements and/or compounds [AI, C]	Topic 2.1 In what ways do chemicals affect your life? pp. 94–103 Topic 2.2 How do we use properties to help us describe matter? pp. 104–111
C1.2 assess the social and environmental impacts of the production or use of a common element or simple compound [AI, C]	Topic 2.5 In what ways do scientists communicate about elements and compounds? pp. 130–139 Topic 2.6 What are some characteristics and consequences of chemical reactions? pp. 140–151
C2. Developing Skills of Investigation and Communication	
C2.1 use appropriate terminology related to the exploration of matter, including, but not limited to: *combustion, conductor, decomposition, lustrous, precipitate, reaction,* and *soluble* [C]	Topic 2.2 How do we use properties to help us describe matter? pp. 104–111
C2.2 use an inquiry process to identify the physical and chemical properties of common elements and simple common compounds, including gaseous substances (e.g., sulfur is a yellow solid; sodium chloride is water soluble; nitrogen gas is colourless, odourless, and very unreactive) [PR, AI]	Topic 2.2 How do we use properties to help us describe matter? pp. 104–111 Topic 2.6 What are some characteristics and consequences of chemical reactions? pp. 140–151
C2.3 plan and conduct an investigation to compare and contrast characteristic physical properties of metals with those of non-metals (e.g., most metals are lustrous or shiny and are good conductors of heat; most non-metals in solid form are brittle and are not good conductors of heat) [IP, PR, AI]	Topic 2.3 What are pure substances and how are they classified? pp. 112–119
C2.4 investigate and distinguish between the physical and chemical properties of household substances (e.g., starch, table salt, wax, toothpaste) [PR, C]	Topic 2.1 In what ways do chemicals affect your life? pp. 94–103 Topic 2.2 How do we use properties to help us describe matter? pp. 104–111

C2.5 investigate and compare the chemical properties (e.g., combustibility, reaction with water) of representative elements within groups in the periodic table families of elements (e.g., Mg and Ca; N and P) [PR, AI]	Topic 2.3 What are pure substances and how are they classified? pp. 112–119 Topic 2.4 How are properties of atoms used to organize elements into the periodic table? pp. 120–129
C2.6 construct and draw models of simple molecules (e.g., H_2, NH_3, CO_2, CH_4) [PR, C]	Topic 2.5 In what ways do scientists communicate about elements and compounds? pp. 130–139
C2.7 conduct chemical tests to identify common gases (e.g., oxygen, hydrogen, carbon dioxide) on the basis of their chemical properties, and record their observations [PR, AI, C]	Topic 2.6 What are some characteristics and consequences of chemical reactions? pp. 140–151
C3. Understanding Basic Concepts	
C3.1 identify the characteristics of neutrons, protons, and electrons, including charge, location, and relative mass	Topic 2.4 How are properties of atoms used to organize elements into the periodic table? pp. 120–129
C3.2 describe the characteristics that distinguish elements from compounds (e.g., elements are pure substances made up of only one kind of atom; compounds are pure substances made up of more than one kind of element)	Topic 2.3 What are pure substances and how are they classified? pp. 112–119
C3.3 identify general features of the periodic table (e.g., metals appear on the left of the periodic table; non-metals appear on the right; elements within the same group have similar properties)	Topic 2.4 How are properties of atoms used to organize elements into the periodic table? pp. 120–129
C3.4 explain the relationships between the properties of elements and their position in the periodic table (e.g., with reference to atomic structure, group, and period)	Topic 2.4 How are properties of atoms used to organize elements into the periodic table? pp. 120–129
C3.5 describe the characteristic physical and chemical properties of common elements (e.g., density, texture, odour, combustibility, solubility, ability to conduct or absorb heat)	Topic 2.2 How do we use properties to help us describe matter? pp. 104–111
C3.6 use symbols and chemical formulae to represent common elements and simple compounds (e.g., C, O, H, H_2O, CO_2)	Topic 2.5 In what ways do scientists communicate about elements and compounds? pp. 130–139
C3.7 identify the elements and compounds in common household products (e.g., hydrogen peroxide, lye, salt)	Topic 2.1 In what ways do chemicals affect your life? pp. 94–103 Topic 2.5 In what ways do scientists communicate about elements and compounds? pp. 130–139

D. Earth and Space Science: The Study of the Universe	
D1. Relating Science to Technology, Society, and the Environment	
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 (e.g., robotic arm technology developed by the space program is used in industry to handle hazardous chemicals; synthetic materials developed to protect astronauts are used in fire-fighting equipment) [IP, PR, AI, C]	Topic 3.4 What role does Canada play in space exploration? pp. 208–217 Topic 3.5 How do we benefit from space exploration? pp. 220–229
D1.2 assess the contributions of Canadians to space exploration (e.g., as astronauts; in research and development) [AI, C]	Topic 3.4 What role does Canada play in space exploration? pp. 208–217
D2. Developing Skills of Investigation and Communication	
D2.1 use appropriate terminology related to space exploration, including, but not limited to: *astronomical units, gravitational pull,* and *universe* [C]	Topic 3.1 What do we see when we look at the night sky? pp. 68–181
D2.2 investigate patterns in the night sky (e.g., constellations) and the motion of celestial objects (e.g., the sun, our moon, planets, stars, galaxies), using direct observation, computer simulations, and/or star charts, and record the information using a graphic organizer or other format [PR, AI, C]	Topic 3.1 What do we see when we look at the night sky? pp. 68–181
D2.3 use a research process to compile and analyse information on the characteristics of various objects in the universe (e.g., planets, stars, constellations, galaxies) [PR, AI]	
D2.4 investigate a technological challenge related to the exploration of celestial objects that arises from the objects' specific properties, and identify the solution that has been devised (e.g., multiple booster rockets power spacecraft travelling to distant planets; heat shields protect the space shuttle from extreme temperatures when re-entering Earth's atmosphere) [PR, AI]	
D3. Understanding Basic Concepts	
D3.1 describe the major components of the universe (e.g., planets, moons, stars, galaxies), the motion of the different types of celestial objects, and the distances between certain objects, using appropriate scientific terminology and units (e.g., astronomical units, light years)	Topic 3.1 What do we see when we look at the night sky? pp. 68–181
D3.2 compare the characteristics and properties of celestial objects that constitute the solar system, including their motion and their distance from other celestial objects in the solar system (e.g., composition, size, rotation, presence and composition of atmosphere, gravitational pull, magnetic field)	Topic 3.3 What has space exploration taught us about our solar system? pp. 196–207

D3.3 identify the factors that make Earth well suited for the existence of life (e.g., a magnetosphere that protects the planet from solar wind; Earth's distance from the sun; the ability of Earth's atmosphere to trap heat, preventing extreme fluctuations in temperature)	Topic 3.2 What are the Sun and the Moon, and how are they linked to Earth? pp. 182–195
D3.4 describe the characteristics of the sun and the effects of its energy on Earth and Earth's atmosphere	Topic 3.2 What are the Sun and the Moon, and how are they linked to Earth? pp. 182–195
D3.5 describe the causes of major astronomical phenomena (e.g., the aurora borealis, solar/lunar eclipses) and how various phenomena can best be observed from Earth (e.g., solar eclipses should be viewed through a telescope equipped with a solar filter, not with the naked eye)	Topic 3.2 What are the Sun and the Moon, and how are they linked to Earth? pp. 182–195
D3.6 describe the role of celestial objects in the traditions and beliefs of selected cultures and civilizations (e.g., Aboriginal peoples; ancients Greek, Mayan civilizations)	Topic 3.5 How do we benefit from space exploration? pp. 220–229
E. Physics: The Characteristics of Electricity	
E1. Relating Science to Technology, Society, and the Environment	
E1.1 assess social, economic, and environmental costs and benefits of using a renewable and a non-renewable resource of electrical energy (e.g., solar, wind, hydro, nuclear, coal, oil, natural gas), taking the issue of sustainability into account [AI, C]	Topic 4.1 How do the sources used to generate electrical energy compare? pp. 244–251
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 (e.g., front-load and top-load washing machines; cathode ray tube [CRT] and liquid crystal display [LCD] computer monitors) [PR, AI, C]	Topic 4.7 How can we conserve electrical energy at home? pp. 314–323
E2. Developing Skills of Investigation and Communication	
E2.1 use appropriate terminology related to static and current electricity, including, but not limited to: *ammeter, ampere, battery, conductivity, current, energy consumption, fuse, kilowatt hours, load, ohm, potential difference, resistance, switch, voltmeter,* and *volts* [C]	Topic 4.2 What are charges and how do they behave? pp. 252–263 Topic 4.4 How can people control and use the movement of charges? pp. 274–291 Topic 4.5 What are series and parallel circuits and how are they different? pp. 292–303 Topic 4.6 What features make an electrical circuit practical and safe? pp. 304–313
E2.2 use an inquiry process to determine and compare the conductivity of various materials (e.g., metals, plastic, glass, water) [PR, AI]	Topic 4.2 What are charges and how do they behave? pp. 252–263
E2.3 conduct inquiries involving conduction and induction to investigate the law of electric charges [PR, AI]	Topic 4.3 How can objects become charged and discharged? pp. 264–273

E2.4 design, draw circuits of, and construct simple series and parallel circuits (e.g., a circuit with: one light bulb; two light bulbs of the same brightness; one light bulb on and the other light bulb off) [IP, PR, C]	Topic 4.5 What are series and parallel circuits and how are they different? pp. 292–303
E2.5 compare, on the basis of observation, the differences between series and parallel circuits [PR, AI]	Topic 4.5 What are series and parallel circuits and how are they different? pp. 292–303
E2.6 use an inquiry process to investigate the effects that changing resistance and changing potential difference have on current in a simple series circuit [PR, AI]	Topic 4.4 How can people control and use the movement of charges? pp. 274-291
E2.7 calculate the costs of running common house-hold electrical devices, and compare their efficiency (e.g., using EnerGuide information) [AI, C]	Topic 4.7 How can we conserve electrical energy at home? pp. 314–323
E2.8 graph and interpret electricity consumption data collected over a period of time from electrical meters at home or in the community (e.g., their school, a local community centre) [PR, AI, C]	Topic 4.7 How can we conserve electrical energy at home? pp. 314–323
E3. Understanding Basic Concepts	
E3.1 compare conductors and insulators, and explain how materials allow static charge to build up or be discharged	Topic 4.2 What are charges and how do they behave? pp. 252–263
E3.2 explain the law of electric charges with reference to common electrostatic phenomena (e.g., charging by contact or by induction)	Topic 4.3 How can objects become charged and discharged? pp. 264–273
E3.3 identify the components of a simple direct current (DC) electrical circuit (e.g., electrical source, electrical load, switch, fuse), and describe their functions	Topic 4.4 How can people control and use the movement of charges? pp. 274-291 Topic 4.6 What features make an electrical circuit practical and safe? pp. 304–313
E3.4 identify electrical quantities and their symbols (e.g., electric current *I*, potential difference *V*, resistance *R*), and explain how they are measured using an ammeter, a voltmeter, and a multimeter	Topic 4.4 How can people control and use the movement of charges? pp. 274-291
E3.5 explain the characteristics of electric current, potential difference, and resistance in simple series and parallel circuits	Topic 4.5 What are series and parallel circuits and how are they different? pp. 292–303
E3.6 describe, qualitatively, the interrelationships between resistance, potential difference, and electric current, in a series circuit (e.g., the effect on current when potential difference is changed)	Topic 4.4 How can people control and use the movement of charges? pp. 274-291
E3.7 explain the practical use of resistance in a common household product (e.g., a toaster or hair dryer)	Topic 4.4 How can people control and use the movement of charges? pp. 274-291