

**Correlation of Grade 9 Manitoba Science Curriculum to
Pearson Science 9: Saskatchewan Edition**

Unit A: Reproduction and Human Development	
S1-1-01 Illustrate and explain the process of mitotic cell division in plants and animals. <i>Include: chromosomes, mitosis, cytoplasmic division, cell cycle.</i>	Section 1.1 Chapter 1 Review
S1-1-02 Observe and explain the dynamic nature of cell division.	Section 1.1 A4 Inquiry Activity Unit Review
S1-1-03 Describe various types of asexual reproduction that occur in plant and animal species. <i>Examples: fission, budding, sporulation, vegetative propagation, regeneration...</i>	Section 1.2 Chapter 1 Review Unit Review
S1-1-04 Investigate and describe agricultural applications of asexual reproduction. <i>Examples: cloning, cuttings, grafting, bulbs...</i>	Section 1.2 A5 Quick Science A7 STSE Chapter 1 Review Unit Review
S1-1-05 Illustrate and explain the production of male and female gametes by meiosis in plants and animals.	Section 1.3 A10 Inquiry Activity Chapter 1 Review
S1-1-06 Compare and contrast the function of mitosis to that of meiosis. <i>Include: diploid cells, haploid cells.</i>	Section 1.3 A9 Problem Solving Activity Chapter 1 Review
S1-1-07 Compare sexual and asexual reproduction in terms of their advantages and disadvantages for plant and animal species.	Section 1.3 A11 Inquiry Activity Chapter 1 Review Unit Review
S1-1-08 Investigate and explain adaptations of plant and animal species which enhance reproductive success. <i>Examples: appearance, behaviour, number of gametes or offspring, chemical cues...</i>	Section 2.1
S1-1-09 Describe the structure and function of the male and female human reproductive systems. <i>Include: role of hormones.</i>	Section 3.2 A24 Quick Science Section 3.3 A26 Quick Science Chapter 3 Review Unit Review
S1-1-10 Outline human development from conception through birth. <i>Include: X and Y chromosomes, zygote, embryo, fetus.</i>	Section 2.3 Chapter 2 Review Section 3.4 Chapter 3 Review Unit Review
S1-1-11 Observe, collect, and analyze class data of single trait inheritance. <i>Examples: hand clasping, earlobe attachment, tongue rolling...</i>	Section 2.1 A12 Quick Science

<p>S1-1-12 Differentiate between dominant and recessive traits. <i>Include: genotype and phenotype</i></p>	<p>Section 2..2 Chapter 2 Review q. 4, 11</p>
<p>S1-1-13 Describe the relationships among DNA, chromosomes, genes, and the expression of traits. <i>Include: genetic similarity among all humans.</i></p>	<p>Section 2.2 Chapter 2 Review Unit Review</p>
<p>S1-1-14 Explain the inheritance of sex-linked traits in humans and use a pedigree to track the inheritance of a single trait. <i>Examples: colour-blindness, hemophilia...</i></p>	<p>Section 2.3 Chapter 2 Review Unit Review</p>
<p>S1-1-15 Investigate and describe environmental factors and personal choices that may lead to a genetic mutation or changes in an organism's development. <i>Examples: fetal exposure to alcohol, overexposure to sunlight, toxins, hormone mimics, food additives, radiation...</i></p>	<p>Section 2.3 A19 Quick Science</p>
<p>S1-1-16 Investigate Canadian and international contributions to research and technological development in the field of genetics and reproduction. <i>Example: Human Genome Project</i></p>	<p>Section 2.3 A20 Decision Making Analysis</p>
<p>S1-1-17 Discuss current and potential applications and implications of biotechnologies including their effects upon personal and public decision making. <i>Include: genetic engineering, cloning, Human Genome Project, DNA fingerprinting.</i></p>	<p>Section 2.3 A20 Decision Making Analysis Chapter 2 Review Section 3.5 Unit Review</p>

Unit B: Atoms and Elements	
<p>S1-2-01 Describe how historical ideas and models have furthered our understanding of the nature of matter. <i>Include: Greek ideas, alchemy, Lavoisier.</i></p>	Section 4.1 Section 5.1 Unit Review
<p>S1-2-02 Investigate the historical progression of the atomic model. <i>Include: Dalton, Thomson, Rutherford, Bohr, and quantum model.</i></p>	Section 4.1 Section 5.1 B9 Quick Science Chapter 5 Review Unit Review
<p>S1-2-03 Define element and identify symbols of some common elements. <i>Include: the first 18 elements and K, Ca, Fe, Ni, Cu, Zn, I, Ag, Sn, Au, W, Hg, Pb, U.</i></p>	Section 4.1 Section 5.2 Section 5.4 Chapter 5 Review Unit Review
<p>S1-2-04 Explain the atomic structure of an element in terms of the number of protons, electrons, and neutrons and explain how these numbers define atomic number and atomic mass.</p>	Section 5.4 Chapter 5 Review Unit Review
<p>S1-2-05 Assemble or draw Bohr atomic models for the first 18 elements and group them according to the number of outer shell electrons.</p>	Section 5.4 B18 Quick Science Chapter 5 Review Unit Review
<p>S1-2-06 Investigate the development of the periodic table as a method of organizing elements. <i>Include: periods, families (groups).</i></p>	Section 5.4 B16 Quick Science Chapter 5 Review
<p>S1-2-07 Investigate the characteristic properties of metals, non-metals, and metalloids and classify elements according to these properties. <i>Examples: ductility, conductivity of heat and electricity, lustre, reactivity...</i></p>	Section 5.2 B10 Quick Science Section 5.4 Chapter 5 Review
<p>S1-2-08 Relate the reactivity and stability of different families of elements to their atomic structure. <i>Include: alkali metals, alkaline earths, chalcogens, halogens, noble gases.</i></p>	Section 5.4
<p>S1-2-09 Compare elements to compounds. <i>Include: atoms, molecules.</i></p>	Section 4.1 Section 5.3 B12 Quick Science Chapter 5 Review
<p>S1-2-10 Interpret chemical formulas of elements and compounds in terms of the number of atoms of each element. <i>Examples: He, H₂, O₂, H₂O, CO₂, NH₃...</i></p>	Section 5.3 Chapter 5 Review Unit Review
<p>S1-2-11 Investigate properties of substances and explain the importance of knowing these properties. <i>Examples: usefulness, durability, safety...</i></p>	Section 4.1 B2 Inquiry Activity Section 4.2 B7 Inquire on Your Own Chapter 4 Review Unit Review

<p>S1-2-12 Differentiate between physical and chemical changes.</p>	<p>Section 4.2 B4 Quick Science B6 Inquiry Activity Chapter 4 Review Unit Review</p>
<p>S1-2-13 Experiment to determine indicators of chemical change. <i>Examples: colour change, production of heat and/or light, production of a gas or precipitate or new substance...</i></p>	<p>Section 4.2 B6 Inquiry Activity</p>
<p>S1-2-14 Investigate technologies and natural phenomena that demonstrate chemical change in everyday situations. <i>Examples: photography, rusting, photosynthesis, combustion, baking...</i></p>	<p>Section 4.2 (a bit)</p>

Unit C: Characteristics of Electricity	
S1-3-01 Demonstrate evidence for the existence of two types of charge.	Section 6.1 C1 Quick Science C2 Inquiry Activity Chapter 6 Review
S1-3-02 Discuss early models of electricity to support the premise that models in science change. <i>Include: one-fluid model, two-fluid model, particle model.</i>	
S1-3-03 Explain how a discrepant event can be used to evaluate the particle model of electricity. <i>Include: the attraction of neutral objects to charged objects.</i>	Section 6.2
S1-3-04 Relate the particle model of electricity to atomic structure.	Section 6.1
S1-3-05 Investigate and explain electrostatic phenomena using the particle model of electricity. <i>Include: conservation of charge, conduction, grounding, attraction of a neutral insulator, induction.</i>	Section 6.1 C2 Inquiry Activity Section 6.2 C3 Quick Science C4 Inquiry Activity C5 Inquiry Activity C6 Inquiry Activity Chapter 6 Review
S1-3-06 Investigate common electrostatic technologies and phenomena and describe measures which reduce dangers associated with electrostatics. <i>Examples: photocopying, static straps to reduce charge buildup, lightning, electrostatic spraypainting, electrostatic precipitator...</i>	Section 6.3 C7 Quick Science C8 STSE Chapter 6 Review
S1-3-07 Construct one or more electrostatic apparatus and explain how they function using the particle model of electricity. <i>Include: pieplate electrophorus.</i>	Section 6.3 C9 Problem-Solving Activity
S1-3-08 Demonstrate and explain the like nature of electrostatics and current electricity. <i>Include: discharge an electrophorus through a neon bulb.</i>	Section 6.3 (a bit)
S1-3-09 Define electric current as charge per unit time and solve related problems. <i>Include: $I = Q/T$.</i>	Section 7.1 (a bit)
S1-3-10 Define voltage (electric potential difference) as the energy per unit charge between two points along a conductor and solve related problems. <i>Include: $V = E/Q$.</i>	Section 7.1 (a bit)
S1-3-11 Identify the five sources of electrical energy and some associated technologies. <i>Include: chemical, photo, thermo, electromagnetic, piezo.</i>	
S1-3-12 Describe resistance in terms of the particle model of electricity.	Section 7.1 (a bit)
S1-3-13 Construct electric circuits using schematic diagrams. <i>Include: series, parallel.</i>	Section 7.2 C15 Problem Solving Activity C17 Inquiry Activity C18 Inquiry Activity

<p>S1-3-14 Use appropriate instruments and units to measure voltage (electric potential difference), current, and resistance.</p>	<p>Section 7.2 C16 Skill Builder Activity C17 Inquiry Activity C18 Inquiry Activity C19 Quick Science</p>
<p>S1-3-15 Compare and contrast voltage (electric potential difference) and current in series and parallel circuits. <i>Include: cells, resistance.</i></p>	<p>Section 7.2 Series Chapter 7 Review</p>
<p>S1-3-16 Investigate and describe qualitatively the relationship among current, voltage (electric potential difference), and resistance in a simple electric circuit.</p>	<p>Section 7.3 C21 Inquiry Activity Chapter 7 Review</p>
<p>S1-3-17 Relate the energy dissipated in a circuit to the resistance, current, and brightness of bulbs.</p>	<p>Section 7.2 (a bit)</p>
<p>S1-3-18 Explain the parallel circuits, the components, and the safety aspects of household wiring. <i>Include: switches, fuses, circuit breakers, outlets.</i></p>	<p>Section 7.2 (a bit) Chapter 7 Review</p>
<p>S1-3-19 Explain safety considerations of some common household appliances. <i>Examples: kettle, heater, toaster...</i></p>	<p>Section 7.3 (a bit)</p>
<p>S1-3-20 Define electrical power as energy per unit time, and solve related problems. <i>Include: $P = E/t$.</i></p>	<p>Section 8.2</p>
<p>S1-3-21 Develop a formula for domestic power consumption costs, and solve related problems. <i>Include: $Cost = Power \times time \times unit\ price/kWh$.</i></p>	<p>Section 8.2</p>
<p>S1-3-22 Analyze the electrical energy consumption of a household appliance. <i>Include: calculate consumption using Energuide labels, read hydro meter, interpret monthly hydro bill.</i></p>	<p>Section 8.2 C24 Quick Science C26 Inquiry Activity Chapter 8 Review</p>
<p>S1-3-23 Recognize and explain the importance of incorporating principles of electrical energy conservation into the decision-making process.</p>	<p>Section 8.1 Section 8.2 Chapter 8 Review</p>
<p>S1-3-24 Use the decision-making process to address an issue associated with the generation and transmission of electricity in Manitoba. <i>Include: hydroelectric power, sustainability.</i></p>	<p>Section 8.1 (content is about Saskatchewan)</p>

Unit D: Explaining the Universe	
S1-4-01 Use a coordinate system to locate visible celestial objects, and construct an astrolabe to determine the position of these objects. <i>Include: altitude, azimuth.</i>	Section 9.1 D1 Quick Science D2 Inquiry Activity D3 Quick Science
S1-4-02 Observe the motion of visible celestial objects and organize collected data. <i>Examples: graph sunrise and sunset data, track the position of the Moon and planets over time, maintain a log of changes in the night sky...</i>	Section 9.1 D2 Using a Star Chart D3 Quick Science D5 Inquiry Activity
S1-4-03 Investigate how various cultures used knowledge of the position and motion of visible celestial objects for navigation. <i>Example: Aboriginal ceremonies linked to seasonal star positions...</i>	Section 9.1 (a bit) Ask an Elder, p. 311
S1-4-04 Compare and contrast historical perspectives on the relationship between Earth and space. <i>Include: geocentric model, heliocentric model.</i>	Section 11.1 Section 11.2 Chapter 11 Review Unit Review
S1-4-05 Explain the apparent motion of the Sun, stars, planets, and the Moon as seen from Earth. <i>Include: daily rising and setting, seasonal constellations, retrograde motion.</i>	Section 9.2 D4 Quick Science D5 Inquiry Activity Section 9.3 Chapter 9 Review Section 11.2 Unit Review
S1-4-06 Differentiate between units of measure used for astronomical distances, and perform simple calculations using these units. <i>Include: astronomical unit, light-year.</i>	Section 9.3 D11 Inquiry Activity
S1-4-07 Compare and contrast scientific and cultural perspectives on the origin and evolution of the universe.	Section 11.1 D20 Quick Science Section 11.2 Chapter 11 Review Unit Review
S1-4-08 Differentiate between the major components of the universe. <i>Include: planets, moons, comets and asteroids, nebulae, stars, galaxies, black holes.</i>	Section 9.2 Section 9.3 Chapter 9 Review Section 10.1 Section 10.2 D16 Quick Science Chapter 10 Review Unit Review
S1-4-09 Explain how various technologies have extended our ability to explore and understand space. <i>Examples: robotics, Canadarm, Hubble telescope, Lunar Rover, shuttle, space station, Sojourner Rover, Pathfinder, and Galileo space probes...</i>	Section 12.1 Section 12.2 Chapter 12 Review Unit Review

<p>S1-4-10 Investigate ways in which Canada participates in space research and in international space programs, and then use the decision-making process to address a related issue. <i>Examples: International Space Station, Canadarm...</i></p>	<p>Section 12.2 D26 STSE Chapter 12 Review</p>
<p>S1-4-11 Evaluate the impact of space science and technologies in terms of their benefits and risks to humans. <i>Examples: search for extraterrestrial life and habitat, remote sensing, predictions of potentially catastrophic impacts, colonization of space by only a few countries...</i></p>	<p>Section 12.2 Section 12.3 Chapter 12 Review D29 Problem-Solving Activity D30 Decision-Making Analysis Unit Review</p>