

# Science 9

*Outcomes*

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# Science 9

## General Curriculum Outcomes

### STSE

1. Students will develop an understanding of the nature of science and technology, of the relationships between science and technology, and of the social and environmental contexts of science and technology.

### SKILLS

2. Students will develop the skills required for scientific and technological inquiry, for solving problems, for communicating scientific ideas and results, for working collaboratively, and for making informed decisions.

### KNOWLEDGE

3. Students will construct knowledge and understandings of concepts in life science, physical science, and Earth and space science, and apply these understandings to interpret, integrate, and extend their knowledge.

### ATTITUDES

4. Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge to the mutual benefit of self, society, and the environment.

## Specific Curriculum Outcomes

Students will be expected to

### Atoms and Elements (25%)

#### PHYSICAL AND CHEMICAL CHANGES

- perform experiments, collect evidence, report findings, and demonstrate a knowledge of WHMIS standards in the laboratory (209-7, 111-6, 210-11)
- investigate materials and describe them in terms of their physical properties (307-12)
- describe changes in the properties of materials that result from some common chemical reactions (307-13)

**ATOMIC THEORY**

- use models in describing the structure and components of atoms and molecules, and explain the appropriate operational definition (307-14, 208-7)

**PERIODIC TABLE**

- identify examples of common elements, and compare their characteristics and atomic structure(307-15)
- use the periodic table as a classification system and compile data about its structure (210-1, 210-2)
- identify the elements and number of atoms, given a chemical formula (307-16)
- provide examples of scientific knowledge that have resulted in the development of technologies (111-1)
- provide examples of technologies that have enhanced, promoted, or made possible scientific research (111-4)
- explain and provide examples of how society’s needs for chemistry incorporate science, technology, and environment (112-3, 112-8)

**Characteristics of Electricity (25%)****ELECTRIC CURRENT**

- describe the flow of charge in an electrical circuit and explain the factors affecting the circuit (109-14, 308-16)
- investigate, in the laboratory, and compare qualitatively, static electricity and electric current (210-7, 308-15)

**SERIES AND PARALLEL CIRCUITS**

- describe series and parallel circuits involving varying resistance, voltage, and current (308-17)
- rephrase questions in a testable form and clearly define practical problems (208-1)
- use instruments effectively and accurately for collecting data (209-3)
- identify and suggest explanations for discrepancies in data and identify potential sources of error and determine the amount of error in measurement (210-7, 210-10)

**ELECTRICITY, ENERGY, AND THE ENVIRONMENT**

- relate electrical energy to domestic power consumption costs (308-18)
- determine quantitatively the efficiency of an electrical appliance that converts electrical energy to heat energy (308-19)
- describe the transfer and conversion of energy from a generating station to the home (308-20)
- make informed decisions and propose a course of action on science, technology, and social issues, including human and environmental needs for electricity and energy (113-9, 113-13)

## Space Exploration (25%)

### THE BEGINNINGS

- describe theories on the formation of the solar system (312-1)
- explain the need for new evidence in order to continually test existing theories about the composition and origin of our solar system and galaxies (110-6, 210-3)
- describe theories on the origin and evolution of the universe (312-3)

### THE UNIVERSE

- describe and classify the major components of the universe (312-2)
- describe and explain the apparent motion of celestial bodies (312-4)
- provide and describe examples of how Canadian research projects and careers are supported through science and technology (112-6, 112-11)

### THE SOLAR SYSTEM

- describe the composition and characteristics of the components of the solar system (312-5)
- explain the need for new evidence in order to continually test existing theories and identify new questions that arise (210-16)
- describe the effects of solar phenomena on Earth (312-6)
- propose alternative solutions to space life, develop a plan and data, and defend, with a report, your group's position (208-4, 209-4, 211-1, 211-3, 211-5)

## Reproduction (25%)

### CELLULAR PROCESSES

- illustrate and describe the basic processes of mitosis and meiosis (304-11)
- identify major shifts in scientific world views (110-3)
- compile and report data and predict values of variables by doing activities on cell populations (210-6, 210-4)

### REPRODUCTION

- identify questions and investigate, in the laboratory, the reproduction of plants and communicate findings (208-2, 211-2)
- distinguish between sexual and asexual reproduction in representative organisms (305-2)
- compare sexual and asexual reproduction in terms of their advantages and disadvantages (305-3)

### GENETICS

- provide examples that arise at home, in an industrial setting, or in the environment that cannot be solved using scientific and technological knowledge (113-10)
- discuss factors that may lead to changes in a cell's genetic information (305-5)

- select and integrate genetics information from various sources and apply criteria for evaluating evidence and sources of information (209-5, 210-8)
- provide examples of science and technology, including Canadian, that have contributed to and developed genetic knowledge (111-1, 112-12)