

## Highlights of Revisions to the Science Grades 7–8–9 Program of Studies (2003 – Updated 2009)

As part of the regular maintenance of curriculum, a review of the Science 7–8–9 Program of Studies (2003) was completed. Minor amendments to specific learner outcomes were recommended in consultation with junior high school science teachers. These amendments, for implementation in September 2009, clarify and update some of the outcomes and have no significant impact on the use of current authorized resources in English and French or on the Provincial Achievement Test (PAT) for Grade 9 Science.

### Grade 7

Page 13, Skill Outcomes, Analyzing and Interpreting, third bullet

- classify organisms found in a study plot

Page 15, Outcomes for Science, Technology and Society (STS) and Knowledge, number 1, third bullet

- investigate trends in land use from natural environments (*e.g., forests, grasslands*) to managed environments (*e.g., farms, gardens, greenhouses*) and describe changes

Page 20, Skill Outcomes, Initiating and Planning, first bullet

- identify science-related issues (*e.g., identify an economic issue related to heat loss in a building*)

### Grade 8

Page 32, Outcomes for Science, Technology and Society (STS) and Knowledge, number 3, fifth bullet

- describe pressure as a force per unit area by using the formula  $p = F/A$ , and describe applications of pressure in fluids and everyday situations (*e.g., describe pressure exerted by water in hoses, air in tires, carbon dioxide in fire extinguishers; explain the effects of flat heels and stiletto heels, using the concept of pressure*)

## Grade 9

Page 51, Outcomes for Science, Technology and Society (STS) and Knowledge, number 1, third bullet

- investigate and interpret dependencies among species that link the survival of one species to the survival of others
  - identify examples of symbiotic relationships (*e.g., organisms that benefit other organisms by providing habitat, food, means of fertilization, or a source of oxygen*)
  - classify symbiotic relationships as mutualism, commensalism, parasitism

Page 52, Outcomes for Science, Technology and Society (STS) and Knowledge, number 2, first bullet

- distinguish between sexual and asexual reproduction, and identify and interpret examples of asexual and sexual reproduction in different species, by:
  - describing mechanisms of asexual reproduction including binary fission, budding and the production of spores
  - describing mechanisms of sexual reproduction (*e.g., cross-fertilization in seed plants, sexual reproduction in mammals*)
  - describing examples of organisms that show both sexual and asexual reproduction (*e.g., yeasts that reproduce both by budding and sexual reproduction; plants that reproduce through suckering, runners or bulbs, as well as by seed production*)
  - describing the formation of zygote and embryo in plant and animal reproduction

Page 52, Outcomes for Science, Technology and Society (STS) and Knowledge, number 2, fifth bullet

- identify examples of dominant and recessive characteristics and recognize that dominance and recessiveness provide only a partial explanation for the variation of characteristics in offspring

Page 57, Outcomes for Science, Technology and Society (STS) and Knowledge, number 2, fourth bullet

- observe and describe patterns of chemical change, by:
  - observing heat generated or absorbed in chemical reactions, and identifying examples of exothermic and endothermic reactions
  - identifying conditions that affect rates of reactions (*e.g., investigate and describe how factors such as heat, concentration, surface area and electrical energy can affect a chemical reaction*)
  - identifying evidence for conservation of mass in chemical reactions, and demonstrating and describing techniques by which that evidence is gathered.

Page 61, Outcomes for Science, Technology and Society (STS) and Knowledge, number 1, second bullet

- describe, in general terms, the forms of organic matter synthesized by plants and animals, including carbohydrates, proteins and lipids

Page 62, Outcomes for Science, Technology and Society (STS) and Knowledge, number 3, third bullet

- comprehend information on the biological impacts of hazardous chemicals on local and global environments, by:
  - interpreting evidence for environmental changes in the vicinity of a substance release
  - interpreting LD50 data and other information on toxicity [*Note: LD50 refers to the amount of a substance found to be lethal to 50% of a population, if ingested.*]
  - identifying concerns with the disposal of domestic wastes, such as paints and oils, and industrial wastes

Page 65, Outcomes for Science, Technology and Society (STS) and Knowledge, number 1, first bullet

- identify, describe and interpret examples of mechanical, chemical, thermal, electrical and light energy

Page 65, Outcomes for Science, Technology and Society (STS) and Knowledge, number 1, third bullet

- investigate and evaluate the use of different electrodes, electrolytes and electrolytic concentrations in designing electrical storage cells

Page 66, Outcomes for Science, Technology and Society (STS) and Knowledge, number 2, sixth bullet

- measure voltages and amperages in circuits (*e.g., determine the resistance in a circuit with a dry cell and miniature light; determine the resistances of copper, nickel-chromium/Nichrome wire, pencil leads and salt solution*)
  - apply Ohm's law to calculate resistance, voltage and current in simple circuits  
**[Prerequisite Skill: Grade 8 Mathematics, Patterns and Relations, Specific Outcome 5]**

Page 66, Outcomes for Science, Technology and Society (STS) and Knowledge, number 3, second bullet

- apply appropriate units, measures and devices in determining and describing quantities of energy transformed by an electrical device, by:
  - measuring amperage and voltage, and calculating the number of watts consumed by an electrical device, using the formula  $P = IV$  [power (in watts) = current (in amps)  $\times$  voltage (in volts)]
  - calculating the quantity of electric energy, in joules, transformed by an electrical device, using the formula  $E = P \times t$  [energy (in joules) = power (in watts)  $\times$  time (in seconds)]**[Prerequisite Skill: Grade 8 Mathematics, Patterns and Relations, Specific Outcome 5]**

Page 66, Outcomes for Science, Technology and Society (STS) and Knowledge, number 3, fourth bullet

- compare energy inputs and outputs of a device, and calculate its efficiency, using the formula, percent efficiency = energy output/energy input  $\times 100$  (*e.g., compare the number of joules of energy used with the number of joules of work produced, given information on electrical consumption and work output of a motor-driven device*)  
**[Prerequisite Skills: Grade 7 Mathematics, Number, Specific Outcome 18; Grade 8 Mathematics, Number, Specific Outcome 12]**

Page 67, Outcomes for Science, Technology and Society (STS) and Knowledge, number 4, first bullet

- identify and evaluate sources of electrical energy, including oil, gas, coal, biomass, wind and solar (*e.g., identify and evaluate renewable and nonrenewable sources for generating electricity; evaluate the use of batteries as an alternative to internal combustion engines*)

Page 70, Outcomes for Science, Technology and Society (STS) and Knowledge, number 1, first bullet

- identify different ideas about the nature of Earth and space, based on culture and science (*e.g., compare geocentric and heliocentric models [Note: knowledge of epicycles is not required]; describe Aboriginal views of space and those of other cultures; describe the role of observation in guiding scientific understanding of space*)

Page 70, Outcomes for Science, Technology and Society (STS) and Knowledge, number 1, third bullet

- describe, in general terms, the distribution of matter in star systems, galaxies, nebulae and the universe as a whole

Page 70, Outcomes for Science, Technology and Society (STS) and Knowledge, number 1, fourth bullet

- identify evidence for, and describe characteristics of, bodies that make up the solar system; and compare their composition and characteristics with those of Earth

Page 70, Outcomes for Science, Technology and Society (STS) and Knowledge, number 1, fifth bullet

- describe and apply techniques for determining the position and motion of objects in space, including:
  - constructing and interpreting drawings and physical models that illustrate the motion of objects in space (*e.g., represent the orbit of comets around the Sun, using a looped-string model*)
  - describing in general terms how parallax and the Doppler effect are used to estimate distances of objects in space and to determine their motion

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