Quebec - Achievements and Competencies

Learning Outcomes

Cycle 1 (Gr. 7-8)	Cycle 2 (Gr. 9-10)
Diversity of life forms	Genetics

The Quebec Achievements and Competencies are based on the Progression of Learning Outcomes derived from the Quebec Education Plan set by the Ministere de l'Education, du Loisir et du Sport.

Specific Expectations

GENERAL EDUCATION PATH

CYCLE 1 (Gr. 7-8) — Secondary 1 and 2

LIVING WORLD

A. Diversity of life forms
      2. Diversity of life forms
         a. Physical and behavioural adaptation
            i) Describes physical adaptations that enable animals and plants to improve their chances of survival (e.g. coat colour matched to the environment, shape of leaves)
            ii) Describes behavioural adaptations that enable animals and plants to improve their chances of survival (e.g. movement in groups, phototropism)

In *Tree of Life*, students will observe how species change over the course of millions of years. They will discuss how mutations occur, and how certain physical and behavioural traits may be selected for by the environment.

         b. Evolution
            i) Describes the stages in the evolution of living organisms
            ii) Explains the natural selection process

By playing the *Tree of Life* game, students become familiar with the processes of evolution and natural selection.

         d. Genes and chromosomes
            iii) Describes the role of genes (transmission of hereditary characteristics)

Students will observe that many different species can result from one common ancestor. Students can describe the role of genes in a species and how depending on environmental factors, some genes may remain and some may die out, resulting in speciation.
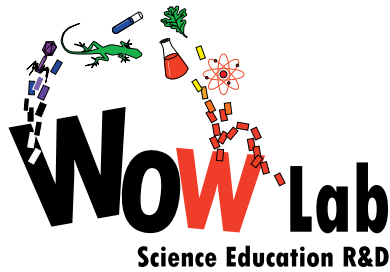
CYCLE 2 (Gr. 9-10) — EST Secondary 4

LIVING WORLD

A. Diversity of life forms
   3. Genetics
     a. Heredity
      i) Defines heredity
     b. Gene
      i) Defines a gene as being, in most cases, a DNA segment that carries the code for synthesizing one or more proteins
     c. Character trait
      i) Defines what an hereditary trait is
     g. Genotype and phenotype
      i) Defines genotype
      ii) Defines phenotype

In *Tree of Life*, students will use concepts relating to genetics, and the diversity of life, such as: heredity, genes, and character traits. Teachers can use this activity to reinforce student understanding of these concepts.

APPLIED GENERAL EDUCATION PATH

CYCLE 1 (Gr. 7-8) — Secondary 1 and 2

LIVING WORLD

A. Diversity of life forms
   2. Diversity of life forms
     a. Physical and behavioural adaptation
      i) Describes physical adaptations that enable animals and plants to improve their chances of survival (e.g. coat colour matched to the environment, shape of leaves)
      ii) Describes behavioural adaptations that enable animals and plants to improve their chances of survival (e.g. movement in groups, phototropism)

In *Tree of Life*, students will observe how species can change over time. They will discuss how mutations may occur, keeping in mind the physical and behavioural changes that may improve chances of survival depending on the environment.

     b. Evolution
      i) Describes the stages in the evolution of living organisms
      ii) Explains the natural selection process

By playing the game, students become familiar with the processes of evolution and natural selection. Teachers can use this activity as an introduction to these concepts, or to reinforce them.
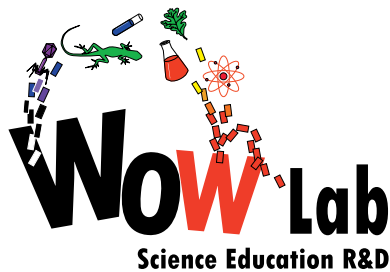
d. Genes and chromosomes
   iii) Describes the role of genes (transmission of hereditary characteristics)

In *Tree of Life*, students will use concepts relating to genetics: genes, heredity, etc. Teachers can use this activity to reinforce student understanding of these concepts.

Strategies

A. EXPLORATION STRATEGIES
1. Studying a problem or a phenomenon from different points of view (e.g. social, environmental, historical, economic)
2. Distinguishing between the different types of information useful for solving the problem
4. Becoming aware of his or her previous representations
6. Formulating questions
7. Putting forward hypotheses (e.g. individually, in teams, as a class)
9. Anticipating the results of his or her approach
13. Using different types of reasoning (e.g. induction, deduction, inference, comparison, classification)
16. Collecting as much scientific, technological and contextual information as possible to define a problem or predict patterns
18. Developing various scenarios
19. Considering various points of view on scientific or technological issues

B. INSTRUMENTATION STRATEGIES
1. Using different sources of information (e.g. books, newspapers, Web sites, magazines, experts)
2. Validating sources of information
3. Using technical design to illustrate a solution (e.g. diagrams, sketches, technical drawings)

C. ANALYTICAL STRATEGIES
1. Identifying the constraints and important elements related to the problem-solving situation
3. Using different types of reasoning (e.g. inductive and deductive reasoning, comparison, classification, prioritization) in order to process information
4. Reasoning by analogy in order to process information and adapt scientific and technological knowledge
5. Selecting relevant criteria to help him or her determine where he or she stands on a scientific or technological issue

D. COMMUNICATION STRATEGIES
1. Using different means of communication to propose explanations or solutions (e.g. oral presentation, written presentation, procedure)
3. Exchanging information
4. Comparing different possible explanations for or solutions to a problem in order to asses their relevance (e.g. full-group discussion)