

## 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 Ministère de l'Éducation, 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

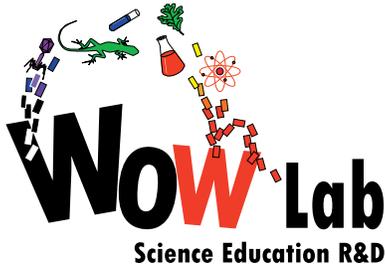
- i) Describes physical adaptations that enable animals and plants to improve their chances of survival (e.g. coat colour matched to the environment, shape of leaves)
- ii) Describes behavioural adaptations that enable animals and plants to improve their chances of survival (e.g. movement in groups, phototropism)

In *Selection in Action*, students will describe how the environment affects a species, or in this case, cars. Some cars are not suitable to survive in certain environments, or obstacles. Students can apply this knowledge to describe how and why plants and animals adapt physically and behaviourally for survival.

##### b. Evolution

- i) Describes the stages in the evolution of living organisms
- ii) Explains the natural selection process

Students will become more familiar with the stages of evolution and the natural selection process. They should use their understanding of these concepts to describe the results observed from each obstacle and their cars.



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## Selection in Action - Quebec - Achievements and Competencies

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

Students should understand what a gene is and the role it plays in human life. They can use this knowledge to explain the similarities and differences between the car generations designed in this activity.

### **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

##### d. Allele

- i) Defines an allele as a possible form of a gene

##### g. Genotype and phenotype

- i) Defines genotype
- ii) Defines phenotype

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

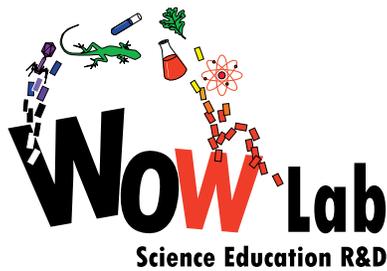
##### e. Homozygotes and heterozygotes

- i) Defines a homozygote as an individual with two identical alleles for a particular character trait
- ii) Defines a heterozygote as an individual with two different alleles for a particular character trait

##### f. Dominant and recessive

- i) Describes the phenomena of dominant and recessive character traits

Students will learn about homozygotes and heterozygotes, as well as dominant and recessive traits. They can describe what traits their cars possess and whether their offsprings would be homozygotes or heterozygotes. Students can discuss dominant and recessive traits and how they may have affected humans over time. They can also apply these concepts to the cars that they used in the activity.



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## Selection in Action - Quebec - Achievements and Competencies

### **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 *Selection in Action*, students will describe how the environment affects a species, or in this case, cars. Some cars are not suitable to survive in certain environments, or obstacles. Students can apply this knowledge to describe how and why plants and animals adapt physically and behaviourally for survival.

##### b. Evolution

- i) Describes the stages in the evolution of living organisms
- ii) Explains the natural selection process

Students will become more familiar with the stages of evolution and the natural selection process. They should use their understanding of these concepts to describe the results observed from each obstacle and their cars.

##### d. Genes and chromosomes

- iii) Describes the role of genes (transmission of hereditary characteristics)

Students should understand what a gene is and the role it plays in human life. They can use this knowledge to explain the similarities and differences between the car generations designed in this activity.

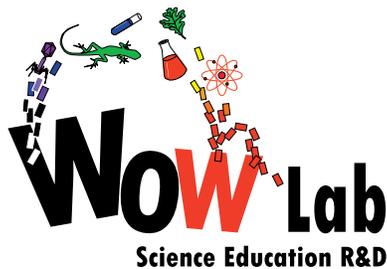
## Techniques

##### A. Technology

##### 2. Manufacturing

##### c. Machining and forming

- i) Chooses the appropriate materials, tools, techniques and processes



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## Selection in Action - Quebec - Achievements and Competencies

### 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 assess their relevance (e.g. full-group discussion)