WOW Lab
Science Education R&D

Quebec - Achievements and Competencies

Learning Outcomes

Cycle 1 (Gr. 1-2)	Cycle 2 (Gr. 3-4)	Cycle 3 (Gr. 5-6)
Properties of matter	Properties of matter	Properties of matter
Mixtures	Mixtures	Mixtures
		Changes in matter

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

CYCLE 1 (Gr. 1-2)

MATERIAL WORLD

A. Matter
 1. Properties and characteristics of matter
  a. Classifies objects according to their properties (e.g. colour, shape, size, texture, smell)

In the *Colourific* activities, students can classify all of the colours in terms of being primary or secondary colours. The students can make predictions and then compare the pure colours left behind on the filter paper in *Colour Changing Markers*. In the *Soap Crayons* and *Puff Paint* activities, students can compare the properties of the two products by using describing words , such as "puffy" or "soft", "smooth" or "rough", "sticky" or "not sticky".
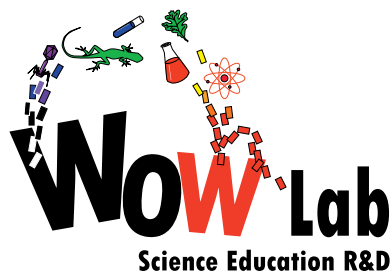
 2. Mixtures
  a. Recognizes mixtures in his/her environment (e.g. air, juice, salad dressing, soup, raisin bread)

Students investigate a variety of mixtures in the *Colourific* activities. The scientific descriptions of all of the mixtures can vary according to the grade level. (e.g. particles that make up the mixtures, difference between physical change and chemical change, surface tension, difference between solution and mixture, miscible and immiscible mixtures)

F. Appropriate Language
 1. Terminology related to an understanding of the material world

Students should use the appropriate terminology throughout the activity. (e.g. primary colours, secondary colours, texture, absorption, mixture)

CYCLE 2 (Gr. 3-4)

MATERIAL WORLD

A. Matter
   1. Properties and characteristics of matter
      e. Describes the shape, colour and texture of an object or a substance

Students should describe how the attributes of the materials used to make *Soap Crayons* and *Puff Paint* contribute to the differences between the two final products. Students should describe and compare their textures, shape, colour, and even their scents. The products from *Swirly Whirly Milk*, *Icy Colours*, and *Colour Changing Markers* can also be compared and described by their appearances in terms of shape, colour, and texture.

   2. Mixtures
      a. Recognizes mixtures in his/her environment (e.g. air, juice, salad dressing, soup, raisin bread)

Students investigate a variety of mixtures in the *Colourific* activities. The scientific descriptions of all of the mixtures can vary according to the grade level. (e.g. particles that make up the mixtures, difference between physical change and chemical change, surface tension, difference between solution and mixture, miscible and immiscible mixtures)

F. Appropriate Language
   1. Terminology related to an understanding of the material world

Students should use the appropriate terminology throughout the activity. (e.g. primary colours, secondary colours, texture, absorption, mixture, solution, miscible, immiscible)


CYCLE 3 (Gr. 5-6)

MATERIAL WORLD

A. Matter
   1. Properties and characteristics of matter
      j. Describes various other physical properties of an object, a substance or a material (e.g. elasticity, hardness, solubility)
      k. Recognizes the materials of which an object is made

Students should describe how the attributes of the materials used to make *Soap Crayons* and *Puff Paint* contribute to the differences between the two final products. Students should describe and compare their textures, shape, colour, and even their scents. As an extension, students can explore various quantities of the materials used in *Soap Crayons* and *Puff Paint* in order to discover other physical properties of the products formed, and then they can compare these to the original products. In *Swirly Whirly Milk*, students should describe the interaction between the dish soap and the milk solution. They should discover that the dish soap affects the surface tension of the milk solution, causing the coloured drops to disperse. The products from *Icy Colours* and *Colour Changing Markers* can also be compared and described by their appearances in terms of shape, colour, and texture.
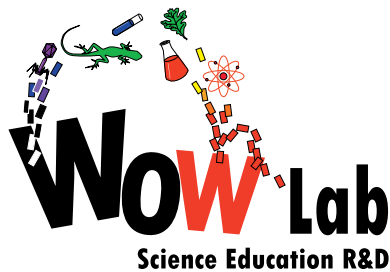
5. Changes in matter
   c. Explains how certain household products are made (e.g. soap, paper)

Students can engage in a discussion that requires them to use their scientific knowledge in order to recognize and list materials that other objects they are familiar with may be made from. (e.g. crayons)

F. Appropriate Language
   1. Terminology related to an understanding of the material world

Students should use the appropriate terminology throughout the activity. (e.g. primary colours, secondary colours, texture, absorption, mixture, solution, miscible, immiscible, surface tension)

Strategies

EXPLORATION STRATEGIES
- Formulating questions
- Putting forward hypotheses (e.g. individually, as a team, as a class)
- Exploring various ways of solving the problem
- Imagining solutions to a problem in light of his or her explanations
- Taking into account the constraints involved in solving a problem or making an object (e.g. location, specifications, available resources, time allotted)
- Using different types of reasoning (e.g. induction, deduction, inference, comparison, classification)
- Using empirical approaches (e.g. trial and error, analysis, exploration using one's senses)

STRATEGIES FOR RECORDING, USING AND INTERPRETING INFORMATION
- Using a variety of observational techniques and tools
- Using different tools for recording information (e.g. diagrams, graphs, procedures, notebooks, logbook)

COMMUNICATION STRATEGIES
- Using tools to display information in tables and graphs or to draw a diagram
- Exchanging information
- Comparing different possible explanations for or solutions to a problem in order to assess them (e.g. full-group discussion)