

## 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	Changes in matter	Changes in matter
Use of living things	Interactions between humans and environment	Interactions between humans and environment
	Environmental technologies	Environmental technologies

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

#### **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 *Recycled Paper*, students will use various materials to create recycled paper. Students can classify the materials being used by their colour and texture to predict what the new, recycled paper may look like and feel like.

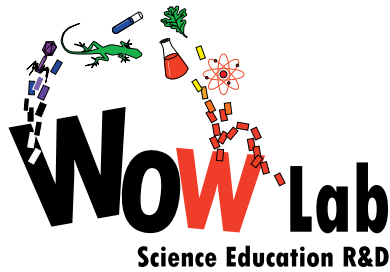
2. Mixtures
  - a. Recognizes mixtures in his/her environment (e.g. air, juice, salad dressing, soup, raisin bread)

Students will recognize that paper is a mixture. It is created from various materials, such as wood pulp and bleach. The recycled paper that the students make is made up of mixtures of other pieces of paper, vegetables, newspaper, and water.

##### F. Appropriate Language

1. Appropriately uses terminology related to the material world

Students are required to use the appropriate terminology throughout the activity (e.g. mixture, substances, materials, paper).



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## Recycled Paper - Quebec - Achievements and Competencies

### LIVING WORLD

#### D. Systems and interactions

##### 2. Use of living things for consumption

- a. Provides examples of how living things are used (e.g. meat, vegetable, wood, leather)

Students will learn that wood can be used to make paper. From this activity, they will come to realize that other materials, such as vegetables, can also be used to make paper.

#### F. Appropriate Language

1. Appropriately uses terminology related to an understanding of living things

Students are required to use the appropriate terminology throughout the activity (e.g. organic).

### **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 will be making recycled paper from materials such as celery and newspaper. They can compare the celery recycled paper to the newspaper recycled paper. They can provide reasons to explain why the recycled paper has certain properties, such as colour or possibly smell, considering the properties of the materials used to make it.

##### 5. Changes in matter

- a. Demonstrates that physical changes (e.g. deforming, breaking, grinding, phase changes) do not change the properties of matter

Students will identify that mixing the original materials together forms a new substance. However, the students should make the distinction between making recycled paper from other paper - which is a physical change, and making recycled paper from vegetables - which is a chemical change because the vegetables are cooked first.

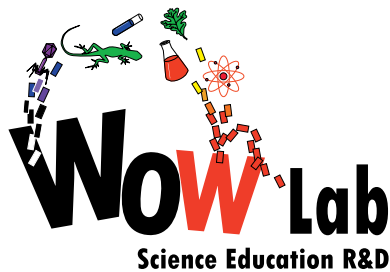
- c. Explains how certain household products are made (e.g. soap, paper)

In this activity, students learn how to make recycled paper. They record their ideas as to how the paper can be made by writing out a procedure, and make predictions about what the result will be. They can engage in a discussion about paper, suggesting other materials that can be used to make recycled paper, such as banana peels.

#### F. Appropriate Language

1. Appropriately uses terminology related to the material world

Students are required to use the appropriate terminology throughout the activity (e.g. mixture, substances, materials, properties, texture, reversible change, irreversible change, physical change).



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### LIVING WORLD

#### D. Systems and interactions

##### 3. Interaction between humans and their environment

- a. Describes the impact of human activity on the environment (e.g. use of resources, pollution, waste management, land use, urbanization, agriculture)

As an extension to this activity, teachers can engage students in discussions about paper-making and paper use, and their impacts on the environment.

##### 5. Environmental technologies

- a. Explains the scientific and technological concepts associated with recycling and composting (e.g. properties of matter, phase changes, physical changes, chemical changes, food chain, energy)

Students will make recycled paper from celery and newspaper. They will understand the concepts associated with this process, such as physical and chemical changes, further developing their knowledge and understanding about recycling.

#### F. Appropriate Language

1. Appropriately uses terminology related to an understanding of living things

Students are required to use the appropriate terminology throughout the activity (e.g. organic, cellulose, fibre, pulp).

### **CYCLE 3 (Gr. 5-6)**

### MATERIAL WORLD

#### A. Matter

##### 1. Properties and characteristics of matter

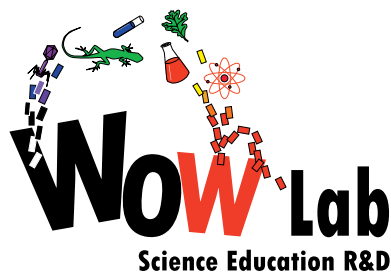
- j. Describes various other physical properties of an object, a substance or a material (e.g. elasticity, hardness, solubility)
- k. Recognizes the materials of which an object is made

Students will be making recycled paper from materials, such as celery and newspaper. They can compare the celery recycled paper to the newspaper recycled paper. They can provide reasons to explain why the recycled paper has certain properties, considering the properties of the materials used to make it. Students can compare different types of paper with one another, such as printer paper, toilet paper, and paper towels, to describe the properties of each and suggest materials that they may be made up of to account for their differences.

##### 5. Changes in matter

- a. Demonstrates that physical changes (e.g. deforming, breaking, grinding, phase changes) do not change the properties of matter
- b. Demonstrates that chemical changes (e.g. cooking, combustion, oxidation, acid-base reactions) change the properties of matter

Students will be making recycled paper from materials such as celery and newspaper. They can compare the celery recycled paper to the newspaper recycled paper. They can provide reasons to explain why the recycled paper has certain properties, such as colour or possibly smell, considering the properties of the materials used to make it.



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c. Explains how certain household products are made (e.g. soap, paper)

In this activity, students learn how to make recycled paper. They record their ideas as to how the paper can be made by writing out a procedure, and make predictions about what the result will be. They can engage in a discussion about paper, suggesting other materials that can be used to make recycled paper, such as banana peels.

F. Appropriate Language

1. Appropriately uses terminology related to the material world

Students are required to use the appropriate terminology throughout the activity (e.g. mixture, substances, materials, properties, texture, reversible change, irreversible change, physical change, chemical change, polymer, monomer).

### LIVING WORLD

D. Systems and interactions

3. Interaction between humans and their environment

a. Describes the impact of human activity on the environment (e.g. use of resources, pollution, waste management, land use, urbanization, agriculture)

As an extension to this activity, teachers can engage students in discussions about paper-making and paper use, and their impacts on the environment.

5. Environmental technologies

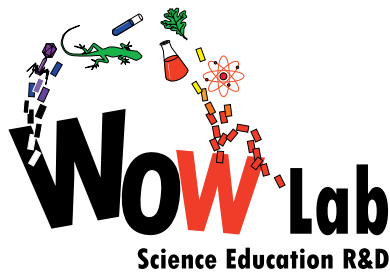
a. Explains the scientific and technological concepts associated with recycling and composting (e.g. properties of matter, phase changes, physical changes, chemical changes, food chain, energy)

Students will make recycled paper from celery and newspaper. They will understand the concepts associated with this process, such as physical and chemical changes, further developing their knowledge and understanding about recycling.

F. Appropriate Language

1. Appropriately uses terminology related to an understanding of living things

Students are required to use the appropriate terminology throughout the activity (e.g. organic, cellulose, fibre, pulp, lignin).



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## Recycled Paper - Quebec - Achievements and Competencies

### Strategies

#### EXPLORATION STRATEGIES

- Studying a problem or a phenomenon from different points of view (e.g. social, environmental, historical, economic perspectives)
- Distinguishing between the different types of information useful for solving the problem
- Recalling similar problems that have already been solved
- Becoming aware of his or her previous representations
- Formulating questions
- Putting forward hypotheses (e.g. individually, as a team, as a class)
- Exploring various ways of solving the problem
- Anticipating the results of his or her approach
- 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. specifications, available resources, time allotted)
- Examining his or her mistakes in order to identify their source
- 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 technical design to illustrate a solution (e.g. diagrams, sketches, technical drawings)

#### COMMUNICATION STRATEGIES

- Using different means of communication to propose explanations or solutions (e.g. oral presentation, written presentation, procedure)
- 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)