

a WOW Lab

BLUEPRINT

Polymer Balls

Quebec - Achievements and Competencies

Learning Outcomes

Cycle 1 (Gr. 7-8)
Chemical changes
Molecules

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

MATERIAL WORLD

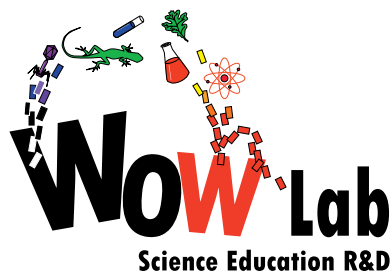
B. Changes

3. Chemical changes

a. Chemical changes

- i) Describes the indicators of a chemical change (formation of a precipitate, effervescence, colour change, heat, light)
- ii) Explains a chemical change based on the changes in the properties of the substances involved
- iii) Names different types of chemical changes (e.g. decomposition, oxidation)

In *Polymer Balls*, students mix latex with vinegar to form one polymer bouncing ball, and also mix white glue with cornstarch and borax to make a second polymer bouncing ball. Students should identify that the formation of a new substance with different properties from the original materials means that a chemical change has occurred. Students should describe the properties of the bouncing balls and compare them to the original materials. Students should compare the latex ball to the cornstarch ball, listing factors that account for their differences. Students will learn that the chemical change that occurs is called polymerization since several monomers are combined to form a polymer.



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C. Organization

1. Structure of matter

b. molecule

- i) Describes a molecule using Dalton's atomic model (combination of atoms linked by chemical bonds)

In this activity, students will learn that polymerization is a chemical process that combines several monomers to form a polymer. Students will define a monomer as a small molecule that can join to other molecules through molecular bonds to form a polymer. This activity can be used to reinforce student understanding of molecules and molecular bonds.

APPLIED GENERAL EDUCATION PATH

CYCLE 1 (Gr. 7-8) — Secondary 1 and 2

MATERIAL WORLD

B. Changes

3. Chemical changes

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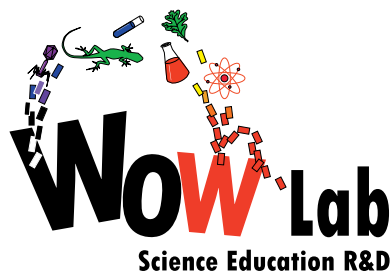
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Techniques

B) Science

- a. Safely using laboratory materials and equipment
 - i) Uses laboratory materials and equipment safely (e.g. allows hotplate to cool, uses beaker tongs)
 - ii) Handles chemicals safely (e.g. uses a spatula and pipette filler)
- d. Using measuring instruments
 - i) Adopts the appropriate position for reading an instrument
 - iii) Measures the volume of a liquid using the appropriate graduated cylinder

Strategies

A. EXPLORATION STRATEGIES

6. Formulating questions
7. Putting forward hypotheses (e.g. individually, in teams, as a class)
9. Anticipating the results of his or her approach
10. Imagining solutions to a problem in light of his or her explanations
11. Taking into account the constraints involved in solving a problem or making an object (e.g. specifications, available resources, time allotted)
12. Examining his or her mistakes in order to identify their source
13. Using different types of reasoning (e.g. induction, deduction, inference, comparison, classification)
14. Using empirical approaches (e.g. trial and error, analysis, exploration using one's senses)
15. Ensuring that the procedure is appropriate and safe and making the necessary adjustments

B. INSTRUMENTATION STRATEGIES

4. Using different tools for recording information (e.g. diagrams, notes, graphs, procedures, logbook)
5. Using a variety of observational techniques and tools

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

D. COMMUNICATION STRATEGIES

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)
5. Using tools to display information in various formats (e.g. data tables, graphs, diagrams)