a WOW Lab BLUEPRINT Polymer Balls

Quebec - Achievements and Competencies

Learning Outcomes

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

In *Polymer Balls*, students will make two types of bouncy balls - one made of latex and vinegar, and one made of cornstarch, borax and white glue. Students can describe and compare the textures and shapes of the two types of balls.

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

Students should notice that when the bouncing ball is created, a new substance is formed. They can discuss that this is a chemical change - one that involves a chemical reaction - rather than a physical one. They should understand that the bouncing ball cannot be separated into its original materials, and that this means that the change is irreversible.

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

Teachers can engage students in a discussion about the materials used in this activity, and ask them to list other things that they can be used for.

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, properties, texture, reversible change, irreversible change, physical change).

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

In *Polymer Balls*, students will make two types of bouncy balls - one made of latex and vinegar, and one made of cornstarch, borax and white glue. Students can describe and compare the textures and shapes of the two types of balls.

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 should notice that when the bouncing ball is created, a new substance is formed. They can discuss that this is a chemical change - one that involves a chemical reaction - rather than a physical one. They should understand that the bouncing ball cannot be separated into its original materials, and that this means that the change is irreversible.

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

Teachers can engage students in a discussion about the materials used in this activity, and ask them to list other things that they can be used for.

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, properties, texture, reversible change, irreversible change, physical change, chemical change, monomer, polymer).

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BLUEPRINT

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Strategies

EXPLORATION STRATEGIES

- 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 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)