a WOW Lab BLUEPRINT

Saponification

Quebec - Achievements and Competencies

Learning Outcomes

Cycle 1 (Gr. 7-8)	Cycle 2 (Gr. 9-10)
Chemical changes	Chemical changes

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

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

Teachers can use *Saponification* to reinforce student understanding of chemical changes. Throughout this activity, students should be able to describe the indicators of the chemical change that occur from mixing vegetable shortening and sodium hydroxide. A new substance, soap, is formed, and the colour, texture, and properties of the soap are different from the two starting materials that are used to make it. Another indicator of a chemical change is that the soap cannot be changed back into the two starting materials.

CYCLE 2 (Gr. 9-10) — Secondary 4

MATERIAL WORLD

B. Changes
- 3. Chemical changes
  - g. Acid-base neutralization reaction
    - i) Gives examples of acid-base neutralization reactions (e.g. adding lime to neutralize the acidity of a lake)

ii) Names the products formed during acid-base neutralization (salt and water)

In *Saponification*, students will learn that a chemical reaction occurs between a fatty acid and a base to form a salt of the fatty acid as well as glycerol. Vegetable shortening is used as the acid and sodium hydroxide as the base. Different variations of acids and bases can be used, such as olive oil and potassium hydroxide.

APPLIED 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

Teachers can use *Saponification* to reinforce student understanding of chemical changes. Throughout this activity, students should be able to describe the indicators of the chemical change that occur from mixing vegetable shortening and sodium hydroxide. A new substance, soap, is formed, and the colour, texture, and properties of the soap are different from the two starting materials that are used to make it. Another indicator of a chemical change is that the soap cannot be changed back into the two starting materials.

CYCLE 2 (Gr. 9-10) — SE Secondary 4

MATERIAL WORLD

B. Changes
3. Chemical changes
g. Acid-base neutralization reaction
i) Gives examples of acid-base neutralization reactions (e.g. adding lime to neutralize the acidity of a lake)
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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
  - ii) Measures the volume of a liquid using the appropriate graduated cylinder

C. Techniques common to Science and Technology
- a. Verifying the repeatability, accuracy and sensitivity of measuring instruments
  - i) Takes the same measurement several times to check the repeatability of the instrument used
  - ii) Carries out the required operations to ensure the accuracy of a measuring instrument (e.g. cleans and calibrates a balance, dries out a graduated cylinder, rinses and calibrates a pH-meter)

Strategies

A. EXPLORATION STRATEGIES
1. Studying a problem or a phenomenon from different points of view (e.g. social, environmental, historical, economic)
3. Referring to similar problems that have already been solved
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
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)
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
19. Considering various points of view on scientific or technological issues

B. INSTRUMENTATION STRATEGIES
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 asses their relevance (e.g. full-group discussion)