

a WOW Lab

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Rainbow in a Bottle

Achievements and Competencies

Learning Outcomes

Grades K-3	Grades 4-6
Exploring the world with our senses	Properties and changes of materials
Materials and our senses	
Properties of objects and materials	
Relative position and motion	

Achievements and Competencies are based on the Common Framework of Science Learning Outcomes (K-12) set by the Canadian Council of Ministers of Education.

Specific Expectations

Kindergarten

Exploring the world with our senses

100-3 Detect consistency and pattern in objects and events and use language to describe these patterns (e.g., explore sound patterns through listening, singing and speaking activities; explore visual patterns by observing their surroundings, recognize patterns that are found in recurring events and in ways that things change).

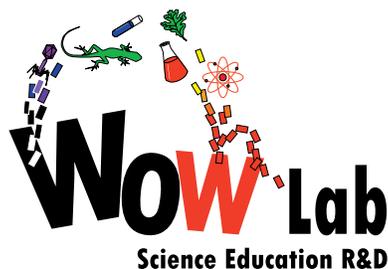
The *Rainbow in a Bottle* activity uses sugar-water solutions of different concentrations to create a coloured rainbow pattern in a bottle.

Grade 1

PHYSICAL SCIENCE

Materials and our senses

100-11 Demonstrate ways that materials can be changed to alter their smell and taste (e.g., describe changes in the taste and appearance of lemonade when different amounts of sugar, water and lemon are added. Compare the aroma and texture of food at different temperatures, with different spices, and cooked in different ways)



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Creating the six solutions, each with a different colour and amount of sugar dissolved in water, allows the students to describe the differences between each solution.

101-4 Describe ways in which materials can be changed to alter their appearance and texture (e.g., demonstrate and describe ways of changing the rough surface of a piece of wood, such as by sanding, painting or waxing. Describe ways to obtain a particular shade or colour by mixing two or more paints).

The students are able to create different coloured solutions by mixing two or more colours together. For example, the purple sugar solution is created by adding one drop of blue food colouring and one drop of red food colouring.

Grade 2

PHYSICAL SCIENCE

Properties of objects and materials

100-17 Investigate and compare properties of familiar liquids and solids (e.g., compare the texture and appearance of solids such as rocks, pencils and modeling clay. Compare properties of different liquids and their droplets when placed on wax paper).

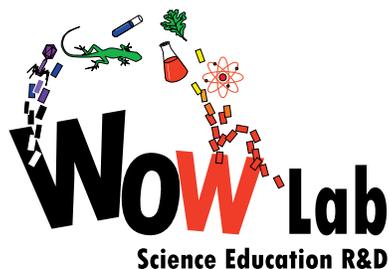
The six coloured solutions can be investigated and compared to determine which solution is the most concentrated and how the appearance varies between solutions.

100-18 Investigate and describe the interactions of familiar liquids and solids (e.g., investigate and describe the interaction of liquids with different surfaces, powdered solids and other liquids. Investigate and describe ways of changing the characteristics of liquids and solids).

The six sugar solutions are created by dissolving different amounts of solid sugar into 1 cup of water. The students can describe how the solid sugar interacts with water, and determine what happens when more sugar is added to the solutions.

100-20 Investigate changes that result from the interaction of materials and describe how their characteristics have changed (e.g., determine that melting ice changes its feel, flow and ability to interact with other materials and recognize that the changes can be reversed. Discover that mixing materials may create a new material with characteristics that are different from the original components).

Students will investigate and compare changes in the solutions' characteristics. A change in concentration of the solution occurs when more sugar is added to the same amount of water. Similarly, the colour of the solution changes when various colours are added and mixed together.



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PHYSICAL SCIENCE

Relative position and motion

100-22 Describe the motion of an object in terms of a change in position and orientation relative to other objects (e.g., describe a change in position using language such as “backward” or “forward,” “upward” or “downward,” “left” or “right”. Describe a turning or rolling motion and predict its direction).

Rainbow in a Bottle uses different sugar and water solutions to demonstrate how the coloured solutions can be layered according to their different densities.

Grade 5

PHYSICAL SCIENCE

Properties and changes of materials

301-10 Identify and describe some changes to materials that are reversible and some that are not.

Adding sugar to water creates a sugar and water solution. Adding more sugar in increments alters the concentration and density of the solutions.

301-11 Describe changes that occur in the properties of materials when they interact with each other.

Incremental addition of the solute (sugar) to the solvent (water) increases the concentration of the solution. The interaction between sugar and water is used to create six solutions with different colours and different concentrations.