
For teachers

Bathing and bubbling with chemistry

Objectives/Competences

Through the study of bath bubblers, a common, well-known product of daily use, we aim to connect chemistry with everyday life, and increase students' interest in chemistry. Also to know the role/function of the ingredients. Further, we extend the topic to effervescent medical tablets, the function of which is based on the same principle. Baking products such as baking soda are an integral part of this activity. The activity provides the opportunity to study acid-base chemistry, and in particular the neutralisation reaction. In addition, we have the opportunity to refer to a large number of chemical substances. Beyond the knowledge of these substances, it is expected that students will develop abilities of *teamwork*, of *searching* and *evaluating* of information from the *Internet*; finally, through the practical activity, to gain *manipulative skills*. A notable feature of the practical activity is its **creativity** feature; it is known that students express a preference for such activities.

Task description

Phase 1

We distribute the students into groups of 3-5 (an optimum number is 4).² We take care that in each group there is a mixing a male and female students, as well as of varying abilities; a

² There have been studies (Webb, 1989) that suggested that pairs function better because peers cannot withdraw and leave the responsibility of the discussion to others. On the other hand, larger groups (e.g. fours) allow students to consider a wider range of ideas (Needham, 1987). Additional research reported that students progressed significantly more in their physics reasoning when interacting in fours rather than in pairs (Alexopoulou & Driver, 1996). Working in groups of four seemed acceptable to the majority of students in another study (Tsaparis & Gorezi, 2007).

mixing of students of different cultural origins if such a differentiation is the case. We distribute student into groups of 3-5 (an optimum number is 4).² We take care that in each group there is a mixing a male and female students, as well as of varying abilities; a mixing of students of different cultural origins if such a differentiation is the case. Immediately, we assign each group the task of going to a supermarket and buy a small selection of bath bubblers; OR to buy baking soda and other similar baking products; OR to buy from a pharmacist various effervescent medical tablets. Following that they should cooperate in identifying from the product packages the ingredients of each product.

Phase 2

In class, students work under the teacher's guidance to group the ingredients into particular groups, depending on their action/functioning. This action is then discussed in class. A general reference to the composition of bath bubblers can be made afterwards.

Students also search in the Web for other applications of the same technique (Baking powder and baking soda, antacid medical tablets, effervescent medical tablets, baking swelling substances used in confectionary). (See Teacher Notes)

Phase 3

Students present their previous work in class to their schoolmates. Each group presents its pre-activity work. This activity is very important for the development of communication and presentation skills. Traditionally, students lack experience in communication skills, and as a result are very poor presenters. Power-point presentations are very convenient and will contribute to developing and projecting their abilities in computer technologies.

Phase 4

Students undertake to prepare in lab their own bath bubbler, using available at home materials, and testing the action of their bath bubbler in hot and cold water (see Picture 1).

SAFETY NOTE! *Students should not taste or come into contact with chemical substances.*



Picture 1. An instance of testing the bath-bubbler prepared by students in a Greek ninth-grade class. An enthusiastic student shows to classmates of another group (who were doing a different experiment) the result of her experiment.

Phase 5

Answers to Questions

1. The gas produced is carbon dioxide. See reaction above in [phase 2](#).
2. Water dissolves the solids and enables the ions to move, collide, and produce a reaction in solution. If the humidity is high enough, this could provide enough moisture to dissolve the solids and start the bubbler reaction.
3. Bath bubblers will spin and fizz in water. The rate of bubbling increases with an increase in water temperature.
4. Alka-Seltzer tablets contains aspirin, sodium bicarbonate, and citric acid. They have the same bubbling reaction, but the tablets also deliver the drug aspirin and excess sodium bicarbonate.
- 5: Citric acid will not lose its potency if it is not exposed to any air and is kept in an airtight container. This probably isn't very feasible in most storage situations though, as humidity is fairly good at getting into the smallest and tightest little spaces. We would recommend using the citric acid within 6 months of receiving it to be on the safe side. There's nothing worse than making a batch of bath fizzies and finding them to be substandard in the fizzing department!



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