



University
of Ioannina

For Students

Bathing and bubbling with chemistry

Task description

Students working in groups will first work at home studying the ingredients of various commercial bath bubblers. Also they study the composition, action and use of various effervescent medical tablets. They do the same with baking soda. Then working in class will systematise the study of the ingredients. Work in class will compliment and systematise the study. Next students will prepare in the lab an elementary bath bubbler and will compare its action with that of the commercial ones.

Phase 1

Students are distributed by the class teacher in groups of 3-5, and are assigned to work at home studying the composition of some commercial bath bubblers of their choice (The teacher however gives directions so that different target products are used.)

Phase 2

Each group will study a different target product (bubblers OR effervescent medical tablets, OR baking products). Students work in groups in class to identify chemically the various ingredients, to characterise the function/use of each ingredient, and to group together various ingredients according to their action and function. Other uses of these compounds should be given attention too.

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Phase 3

Students present their previous work in class to their schoolmates. Each group presents its own category of ingredients.

Phase 4

SAFETY NOTE! *Students should never taste and avoid direct contact with chemical substances.*

Students undertake to prepare in lab a bath bubbler, using available at home materials, and testing the

action of their bath bubbler by using it in cold and hot water.

__1. Measure these dry ingredients into a large bowl: 1/2 cup (110 g) baking soda, 1/4 cup (32 g) cornstarch, 1/4 cup (50 g) citric acid, and 2 ½ tablespoons (36 g) Epsom salts.

__2. Grind the lumps out of the dry ingredients with a large plastic spoon. Mix thoroughly.

__3. Measure and combine the following liquid ingredients into a small cup: 4 teaspoons (20 mL) sweet almond oil, 3/8 teaspoon (~2 mL) water or witch hazel, 1/8 teaspoon (~0.6 mL) of fragrance oil, and 1 drop of food coloring.

__4. Cut a piece of plastic wrap to fit over the cup. While holding the wrap in place over the top of the cup, swirl the ingredients to mix them thoroughly.

__5. While stirring constantly with gloved hands, slowly add the liquid mixture to the dry mixture in the bowl. If too much liquid hits the dry ingredients, a reaction will start! Mix in all of the liquid. The mixture should be crumbly (similar to damp sand). Work quickly so that it does not dry out completely.

__6. Pack the damp mixture into molds. Press firmly. If you are using egg molds, pack each side. Then add some loose mixture to one half and firmly push the halves together. Do not twist. The halves do not need to fit together completely. Allow the molds to rest undisturbed for 24 hours.

__7. After 24 hours, unmold the bubblers onto aluminum foil. Tap the mold gently against the tabletop. Without twisting, unmold one side at a time.

__8. Try a bubbler by placing it in a container of hot water. Record your observations (see Picture 1). Try another in cold water. How might the action and ingredients of the bath bubbler be useful in a bathtub?

__9. Let the remaining bubblers harden for two days after unmolding. Then store them wrapped in plastic wrap or in a sealed container.

Phase 5

The project is completed with an evaluation and recapitulation in class of the performed work. The following questions aim to test student's reporting ability and comprehension of issues related to the activity.

Questions

1. What is the gas produced in this reaction? Write the balanced equation.
2. Why was water needed to initiate the reaction? Why could storing the bubblers in a humid environment lead to problems?
3. What did you observe when the bath bubbler was placed in water? Compare your observations from step eight. How does the temperature of the water affect the action of the bath bubbler?
4. What are the ingredients in an Alka Seltzer tablet? What are the ingredients in a Depon effervescent tablet? How do they differ from those in your bath bubbler?
- 5: Will over time citric acid lose its potential for the fizzing action?