(ENG) Flat or Fluffy Cake

Introduction

#Online activity #In-class activity #Inquiry-based learning #Experiential learning #Artwork

Pupils try kitchen chemistry by baking a mug cake and experimenting the fluffiness

Learning Objectives

- [ ] understand how chemistry works in everyday life.

ACTIVITY DETAILS

Activity Details

Connection of the activity with Art

Designing a photograph

Link to local, national School Curriculum

General & Safety/ Role of chemistry in everyday life

Equipment required

- ½ dl of sugar
- ½ dl of flour
- 2 tbsp of cocoa powder
- ½ tsp of baking powder
- ½ tsp of vanilla sugar
- ½ dl of melted butter
- 1 egg
- A mug
- A spoon
- Microwave oven
- Connection to the Internet

Duration of activity

45 minutes

Sources

Drawing credits Wilma Mantere Fluffy cupcake 2022 Free to use

Step 1 - Motivational Stage

Ask the pupils the following questions:

" Why do cakes sometimes go flat? "

“ Can chemistry explain? ”

Step 2 - Investigational Stage

STUDENTS' TASKS

1

Task - Experiment 1

Pupils bake an easy mug cake with a microwave oven.

Give them this recipe:

- [ ] Bake a mug cake.
- [ ] Mix the dry ingredients listed below in a mug, add melted butter and one egg.
- [ ] Thoroughly mix all the ingredients and microwave them in a mug for two minutes.

Ingredients:

• ½ dl of sugar

• ½ dl of flour

• 2 tbsp of cocoa powder

• ½ tsp of baking powder

• ½ tsp of vanilla sugar

• ½ dl of melted butter

• 1 egg

Tell the pupils about the kitchen chemistry with cakes:

A key element in a cake batter are the air bubbles that are trapped by the structure formed by the egg protein and the flour's starch. Baking powder causes these air bubbles to form. During the baking, water evaporates from the melted butter and the egg, and as this evaporated water enters the air bubbles, it causes the dough to rise.

In the beginning the foam-like structure formed by the bubbles is fragile and even the slightest bump will create tears. As the cake bakes, the batter becomes more firm and towards the end there's no need to be particularly careful anymore.

When the cake is taken out of the oven, the evaporated water trapped inside the bubbles cools down and condenses. Negative pressure causes the cake to fall. Because of this, you should create perforations in the cake as soon as it is taken out of the oven. You can poke holes in the cake with a wooden stick or bang it against the table. This jolt creates perforations, allowing air to flow into the negative-pressure bubbles.

2

Task - Experiment 2

Test the theory by making two mug cakes. Take the first one gently out of the microwave and allow it to cool as it is. Bang the other one against the table or poke holes in it. Compare and see which one fell more.

3

Task - Experiment 3

Decorate your cake and take a picture. Pay attention to appropriate lighting and angle.

You can find tips online by using the search term photographing cakes. Pupils looking for an extra challenge can find out more about the chemistry of baking cakes

Example

EXAMPLE LINK

More information about the study of kitchen chemistry can be found at:

READ MORE

They can also check still lifes to see the arrangements they can incorporate to their pictures

READ MORE

Step 3 - Consolidation Stage

Organize a virtual cake competition, where the pupils vote for the fluffiest cake. The winner can tell how understanding kitchen chemistry can make you a better chef.

End of the activity

EXIT