Student Guide

An Easy (Bake) Approach to an Edible Nano Lab

Introduction to lesson:

The purpose of the lesson is to get you interested in basic nanotechnology concepts associated with creation of "wafers" made in cleanrooms. These wafers contain the chips that form the basis of electronic devices like a PS3, iPad, and cell phones. A cleanroom is a laboratory that has super filtered air so that no particles in the air can interfere with the making of the chips. Dust and other particles are often bigger they the chip's parts and if they "land" on the device they could damage it. The lesson also provides you with a general overview of the purpose and use of a completed wafer, a better understanding of how a wafer is created using standard nanotechnology lab equipment, and a hands-on creation of a simulated wafer model using a common toy in this edible science lab activity.

Materials

- Cake/brownie mix
- EasyBake® Oven
- Oven utensils and pan
- Sprinkles
- Construction Paper, pencil, scissors
- Dessert Topping
- Spinner device
- Non-stick Spray
- Clear tape

Procedures:

(Prior to lab, your teacher will guide you in completing a pattern)

a. You will need to spray your baking container with non-sticking cooking/baking spray. This will aid in the lab clean-up.

b. Next, pour pre-mixed cake/brownie batter into your baking container. The batter should fill half the container since the mix will rise when baking.

c. You will then curl tape and place it on the bottom of your container. Then you will place your filled baking container on top of the spinning device. As you start the spinner by attaching wires to the corresponding battery leads, you will make adjustments to the baking container in attempts to make sure its spins evenly in its

Developed by Joey Nunn
*Development and distribution partially funded by the **National Science Foundation***

NNIN Document: NNIN-1258
Rev: 09/2012

rotation. You will spin your baking container for approximately 10-15 seconds or until the mixture is spread evenly across the container.

Container (empty in above picture) loaded on "spinner" device

d. Next, remove your container from the spinning device and insert the container into the pre-warmed EasyBake® oven for approximately 2-3 minutes. You should watch the mixture as it rises and remove once you notice a crust forming on top of the mixture.
e. Remove the container and let the mix cool.
f. Next, you will spray a light coating (one second spray) of the cooking/baking spray on top of the mixture. This will aid in the sprinkles sticking to the baked mixture.
g. Next, you will apply your pre-designed pattern (mask), done prior to lab, on top of the cooled mixture and add sprinkles over the pattern, ensuring the sprinkles are sticking to the baked mixture. You should remember to lift the pattern off the mixture by picking it up and not by sliding it across the top of the mixture. This keeps sprinkles in place.
h. You should then place the container back into the oven for 30 seconds to guarantee that the sprinkles stay in place.
i. Once removed from the oven, you should pour a very light layer of the Smucker's® Magic Shell Ice Cream Topping onto the top of the mixture with the sprinkles. Be advised that adding too much topping will minimize your ability to see the design.
j. Next, place your container into a refrigerator freezer for approximately five minutes to allow the topping to cool.
k. You may consume your wafer after the rest of the class is allowed to see the various designs of the other students.

Developed by Joey Nunn
*Development and distribution partially funded by the **National Science Foundation***

Lab Questions to Answer

Explain the term “wafer.”

Explain how a silicon chip/wafer is used.

What are the steps in creating a wafer?

Explain the term “coating.”

Explain the term “etching.”

What is the purpose of the “spinning” application?

Explain the term “uniformity.”

How do the sprinkles relate to the wafer?

Explain the representation of the chocolate coating as it relates to the wafer.

What is the role of the oven in the creation of a wafer?

Developed by Joey Nunn
*Development and distribution partially funded by the **National Science Foundation***

NNIN Document: NNIN-1258
Rev: 09/2012

Draw Conclusions

1. Example: Based on your results, do you feel that _____? Explain your answer.

Developed by Joey Nunn
Development and distribution partially funded by the ***National Science Foundation***