Project Exploration creates transformative learning opportunities for youth underrepresented in the sciences --particularly students of color and girls -- by equipping them with the skills, practices, and mindset needed for a lifelong pursuit of learning. STEM@Home makes activities around science, technology, engineering, and math accessible and fun to do at home. This STEMbook activity, resources, and more are available at www.projectexploration.org/stemathome.

In this activity, you will:

bake ice cream!

Supplies Required:

- Ice Cream (half gallon)
- Sponge Cake (2) or vanilla wafers
- Egg Whites (3)
- Sugar (1 cup)
- Cream of tartar (half tsp)
- Spoon
- Bowl (2)
- Plastic wrap
- Spatula
- Cake Pans (2)
- Oven Mitts
- Electric Mixer (with bowl if not attached)
- Knife

Video

How to make baked ice cream: https://tinyurl.com/y9zyorxe

Overview

Do you think you could bake ice cream in an oven at 400 degrees without melting?! What do you think will happen!? Heat is the energy that automatically flows from a higher temperature to a lower temperature. This energy can flow in three ways. Sometimes, it is carried by a movement of fluids (liquids or gases) known as convection. An example is when hot air in your oven flows to colder areas. Other times, radiation carries this energy. When the grill in your oven glows red, you can feel it radiate heat. Direct contact is the third way this energy can flow from one place or object to another. We can prevent this energy flow by using thermal insulators, which are made of materials that hinder the flow of heat. An insulator can keep the heat out, like in a cooler or insulated bag, or in, like in a Thermos or a Yeti.

To keep ice cream solid inside a hot oven, you need to protect it with thermal insulators. Luckily, some baked desserts are excellent insulators. Sponge cake and meringue are good examples because they have plenty of air bubbles trapped in them. This layer of stationary air keeps the heat out. Similarly, stationary air can keep the heat in. Examples are cardboard cups, down feathers, or layered clothing.

Instructions

1. ****ADULT NEEDED****
2. Take both bowls and double line them with Saran wrap (make sure wrap is overlapping). Divide ice cream in half and place each half in a bowl. Spread ice cream evenly--make sure there's no air pockets. Cover ice cream tightly.
3. Preheat oven at 400 degrees.
4. Prepare egg whites in the mixer--beat at medium speed until the texture changes into a foam. Have an adult to assist you!
5. Add the cream of tartar while still mixing.
6. Add a little sugar at a time (adult continues mixing) until all sugar is gone. Custard should have a texture resembling Cool Whip. Wow, you've made Meringue!
7. Place cakes in the middle of their pans. Take one ice cream mold from the freezer, unwrap the top layer, place the flat part of the mold on top of the cake (make sure it's in the middle of the cake, remove the rest of the wrap).
8. Using a spatula, cover both cake/wafers and ice cream mold with a thick layer of Meringue.
9. Have an adult place the pan in the oven for about 10 min ONLY! Meringue will be a little brown.
10. Take the other ice cream mold out and place on the middle of the other cake. NO MERINGUE! Place pan in the oven and bake for 15 min.
11. Have an adult cut the first ice cream in half. Is it still cold and solid?
12. Have an adult remove the second pan from oven. Did the ice cream remain cold and solid, or did it melt?

Additional Resources

Think About It! What happened between the two pans? Why do you think that happened? What did the merigue do to the ice cream? Did the cake have an affect on the outcome? Explain your thinking!

1. Three types of heat transfer: https://tinyurl.com/vps478n
2. Heat conductors and insulators: https://tinyurl.com/syyau8g
3. Read and learn about heat energy with Ducksters: https://tinyurl.com/y927bwlb

Share It Out

Share on social media: Share this with yours peers by making a mini video! You can also challenge those who have never tried this experiment. Ask them to come up with their favorite desserts that are normally cold and see what happens when heated, or vice versa!

Use the hashtags:

#PEBakedIceCream
#ProjectExploration
#StemAtHome

Share via PE's website: Students who complete STEM@home activities and share what they learned with the PE team via our website will earn points which can be traded in for cash prizes at the Explore Store. Your project number is 209. Learn more at www.projectexploration.org/explore-store

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