

# LET'S GET CHEMICAL

## DAY FIVE: COOKIE CHEMISTRY



Oklahoma State University, as an equal opportunity employer, complies with all applicable federal and state laws regarding non-discrimination and affirmative action. Oklahoma State University is committed to a policy of equal opportunity for all individuals and does not discriminate based on race, religion, age, sex, color, national origin, marital status, sexual orientation, gender identity/expression, disability, or veteran status with regard to employment, educational programs and activities, and/or admissions.  
For more information, visit <https://eeo.okstate.edu>.



# COOKIE CHEMISTRY

## Welcome to Let's Get Chemical Day Five!

This week you have learned all about physical and chemical reactions. Today, you are going to see just how sweet those reactions can be by making cookies! When it comes to baking, all ingredients play an important role in making sure you create the most tasty treats. Today you are going to learn about the different ingredients in cookies, and why each ingredient plays a role in forming the best cookies you can make! For more information, visit [tinyurl.com/kstatecookiechem](http://tinyurl.com/kstatecookiechem)



### Flour

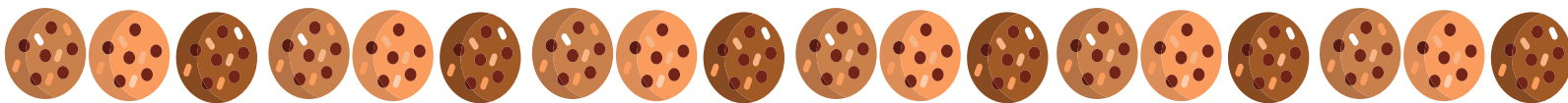
Flour is important in creating the texture of your cookies. It's what makes cookies chewy, crispy and crumble. Flour also contains gluten, which is the protein that helps to hold cookies together.

### Baking Soda

Baking soda serves as the leavening agent. A leavening agent is a substance used in dough or batter to make it rise. Other examples of leavening agents include yeast and baking powder.

### Salt

Salt will help with flavoring, but it also controls the rising of cookies. Without this flavor enhancer, the secondary flavors in a cookie fall flat as the sweetness takes over. Salt also strengthens the protein in a dough, making cookies more chewy.



### Butter

Butter is what makes cookies tender and contributes to the flavor. Butter is about 80% fat and 18% water, which is what causes cookies to spread and melt down in the oven.

### Granulated Sugar

Granulated sugar makes cookies brown by caramelizing and crispier by absorbing some of the moisture in the cookie dough. Granulated sugar also helps the cookies spread as it melts.

### Eggs

Eggs are a major source of moisture and protein in cookie dough. The liquid in eggs gives a cookie structure by bonding with the starch and protein from flour. The protein from eggs helps to keep cookies chewy.



### Vanilla Extract

Vanilla is used in cookies for the yummy flavor! Real vanilla and imitation vanilla contain the same flavor molecules, but real vanilla extract has a more complex flavor because of other molecules from the plant.

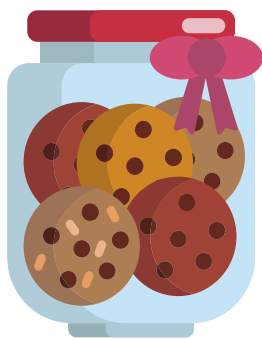
### Brown Sugar

Brown sugar adds a caramelized flavor and makes cookies chewy and moist. This is because brown sugar contains molasses. Molasses adds moisture, and because it's slightly acidic, causes the proteins in cookie dough to firm up

### Chocolate Chips

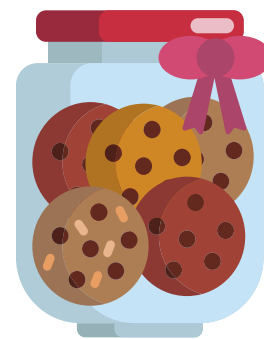
Chocolate chips are completely optional. They can be the star of the show, or you can bake cookies without them, it's all up to preference! You can choose different chips like peanut butter, white chocolate, dark chocolate and more.

# COOKIE CHEMISTRY



## **Ingredients:**

- 2 ¼ Cups All-Purpose Flour
- 1 Teaspoon Baking Soda
- 1 Teaspoon Salt
- 1 Cup (2 Sticks) Butter, Softened
- ¾ Cup Granulated Sugar
- ¾ Packed Brown Sugar
- 1 Teaspoon Vanilla Extract
- 2 Large Eggs
- 2 Cups Chocolate Chips
- 2 Mixing Bowls
- Measuring Cups
- Measuring Spoons
- Something to mix with
- Baking Sheet



## **Instructions:**

- Preheat oven to 375° F
- Mix dry ingredients in a bowl (flour, baking soda and salt)
- Mix together wet ingredients in a separate bowl (sugar, brown sugar, vanilla , butter and eggs)
- Add dry ingredients into the wet ingredients slowly, mixing as you add to ensure they are evenly distributed.
- Add and mix in chocolate chips.
- Place rounded teaspoons of cookie dough about 2 inches apart on an ungreased cookie sheet.
- Bake for 9-11 minutes or until golden brown.
- Give them time to cool before enjoying!

## **Vocabulary:**

- Wet Ingredients: butter, granulated sugar, brown sugar, eggs, vanilla extract
- Dry Ingredients: flour, baking soda, salt
- Leavening Agent: Substance used in dough or batter to make it rise.

## **Challenge!**

While your cookies are baking, do an experiment with cookie ingredients! Add, subtract or substitute your cookie ingredients and make your own recipe to see what happens to your cookies. Be creative! Some examples of cookie experiments are:

- Baking cookies without leavening agents
- Baking cookies with different types of flour
- Baking cookies with all brown sugar and no granulated sugar

