

In this “lab” you will be converting Ms. Lorenowicz’s recipe for Ginger Molasses Cookies from moles to standard cooking measurements and then using that recipe to bake some cookies! You will need the following tables in order to convert your recipe. Happy baking!

Table 1: Simplified Molecular Formulas. Use the following formulas to calculate the mass of ingredient needed. Note: Most of these substances have extremely complex molecular formulas, these are simplified versions only.

Anise	$C_{10}H_{12}O$	Cream of tartar	$KHC_4H_5O_6$
Baking Soda	$NaHCO_3$	Flour	$C_4H_8O_4$
Baking Powder	$NaHCO_3$	Lemon Juice (extract)	$C_6H_8O_7$
Brown Sugar	$C_{12}H_{22}O_{11}$	Margarine	$C_9H_{12}O_6$
Butter	$C_9H_{14}O_6$	Molasses	$C_{12}H_{22}O_{11}$
White Sugar	$C_{12}H_{22}O_{11}$	Pepper	$C_{17}H_{19}O_3N$
Chocolate	$C_4H_8O_4$	Salt	$NaCl$
Cinnamon	C_9H_8O	Vanilla	$C_8H_8O_3$
Ginger	$C_{10}H_{12}O_2$	Eggs	$C_6H_{12}O_3N_2$

Table 2: Unit Conversions. Use the following conversions to turn masses into standard cooking measures.

1 teaspoon of baking soda = 2.84g	1 cup brown sugar = 141.46 g
1 teaspoon of vanilla extract = 4.73g	1 ounce chocolate chips = 28.35 g
1 large egg = 50g	1 tablespoon lemon juice = 14.20 g
1 cup flour = 141.95 g	1 teaspoon baking powder = 2.84 g
1 teaspoon salt = 4.16 g	1 teaspoon ginger = 2.84 g
1 cup butter = 236.59 g	1 teaspoon cinnamon = 2.84 g
1 cup sugar = 198.73 g	1 cup molasses = 356.1 g



Conversion Instructions

Begin by converting moles to grams for each ingredient and record the grams in the table below. Next, convert the number of grams to your final baking measurement; again record the measurements in the table below.

Ingredient	Mass	Standard Cooking Measure
All purpose Flour		
Sodium hydrogen carbonate		
Sodium chloride		
Ground cinnamon		
Ground ginger		
Unsalted butter, soft		
Dark brown sugar		
Matured ovum with yolk overlaid with albumen proteins from <i>Gallus domesticus</i> female		
Molasses		

Ingredients

2.66 mol flour

0.068 mol baking soda

0.018 mol salt

0.022 mol ground cinnamon

0.017 mol ground ginger

0.81 mol unsalted butter, at room temp.

0.41 mol dark brown sugar

0.31 mol egg

0.26 mol regular unsulphured molasses

granulated sugar (for coating cookie dough before baking)

vegetable oil cooking spray (for coating)

Directions

Heat oven to 350 degrees with the rack in the center. Line 2 baking sheets with parchment paper. Set aside.

Sift flour, baking soda, salt, cinnamon and ginger into a medium bowl. Set aside.

Cream the butter and brown sugar in a large mixing bowl with mixer on high speed until light and fluffy, about 1 minute. With mixer on medium speed, beat in the egg and molasses, then increase the speed to high and beat about 1 minute longer, until the mixture no longer looks curdled. Scrape the sides with a rubber spatula several times while mixing.

Mix in the flour mixture on low speed. The batter will be rather stiff. Place some granulated sugar on a small plate or saucer. Use a 1/4 cup ice cream scoop or a measuring cup to form 1/4-cup portions of dough. Transfer the dough to your hands and roll each portion into a rough ball, then roll each ball into the sugar. Place six sugared balls on each baking sheet, spacing them evenly, because they will spread during baking.

Dampen your fingers with water and press down lightly on each cookie to flatten it a little and dampen the top.

Bake for 6 minutes, then turn the sheet 180 degrees halfway. Cook another 6 minutes or until the cookies have spread and are firm to the touch. DO NOT OVER BAKE!