

GRANDMA BUTTON'S FAVORITE MOLASSES COOKIE RECIPE

Reactants needed:

****Note**** All reactants should be at room temperature during the following procedure. Do not double this recipe. (Trust Grandma Button)

- 135 grams partially hydrogenated soybean and cottonseed oils, mono and diglycerides (or 165 grams of butter)
- 266 grams unrefined, dark, crystalline sugar
- 82.5 grams highest grade, pure, un sulphured, whole sugar cane juice
- 50 grams matured ovum with yolk overlaid with albumen proteins from *Gallus domesticus* female.

- 317.25 grams of a blend of hard and soft flours
- 0.0567 moles sodium chloride
- 7.167×10^{22} particles of sodium hydrogen carbonate
- 5 mL dried and powdered rhizome of *Zingiber officinale*
- 5 grams dried and powdered inner bark of *Cinnamomum cassia*
- 1.25 cm^3 of dried and powdered flower-buds of *Eugenia caryophyllata*
- 100 grams sucrose (this is in excess) used to coat outside of cookie

PROCEDURE:

PREHEAT OVEN TO 450 Kelvin

1. To a 2-liter bowl, add 135 grams partially hydrogenated soybean and cottonseed oils, mono and diglycerides and 266 grams unrefined, dark, crystalline sugar. Mix until a homogeneous mixture is obtained.
2. Now add 82.5 grams highest grade, pure, un sulphured, whole sugar cane juice. Stir until well-blended.
3. Add 50 grams matured ovum with yolk overlaid with albumen proteins from *Gallus domesticus* female. Stir until blended.
4. Add together in a 1-liter bowl: - 317.25 grams of a blend of hard and soft flours, 0.0567 moles sodium chloride, 7.167×10^{22} particles of sodium hydrogen carbonate, 5mL dried and powdered rhizome of *Zingiber officinale*, 5 grams dried and powdered inner bark of *Cinnamomum cassia*, 1.25 cm^3 of dried and powdered flower-buds of *Eugenia caryophyllata*. Mix gently to obtain a homogeneous mixture.
5. Add the dry reactants from the 1-liter bowl to the wet reactants in the 2-liter bowl. Slowly stir until well-blended.
6. Form 24.00 gram balls of mixture. Roll in a bowl containing 100 grams sucrose until each ball is well coated with sucrose.
7. Place 12 balls on $304.8 \text{ mm} \times 4.572 \times 10^{-4} \text{ km}$ cookie sheet lined with aluminum foil (shiny side up) or parchment paper. You should have about 36 balls total.
8. Place the cookie sheet into the oven set at 450 K.
9. Bake for 0.007 days.
10. Carefully remove from oven using a hot mitt. Place on a heat-protected surface and allow to come to room temperature (25°C.)
11. Ingest, digest, and egest, but most of all: ENJOY!

CONVERSION SHEET:

partially hydrogenated soybean and cottonseed oils, mono and diglycerides = ©Crisco shortening

1 cup of ©Crisco = 180 grams 110 grams butter = 1 stick = ½ cup

unrefined, dark, crystalline sugar ($C_{12}H_{22}O_{11}$) = dark brown sugar

16.625 grams dark brown sugar = 1 tablespoon

16 tablespoons = 1 cup

highest grade, pure, unsulphured, whole sugar cane juice = molasses

6.875 grams molasses = 1 teaspoon

3 teaspoons = 1 tablespoon

matured ovum with yolk overlaid with albumen proteins from Gallus domesticus female
= chicken egg

1 large chicken egg with shell removed = 50 grams

blend of hard and soft flours = all-purpose flour

2/3 cup of all-purpose flour = 94 grams

sodium chloride (NaCl) = table salt

1 teaspoon table salt = 6.63 grams

sodium hydrogen carbonate ($NaHCO_3$) = baking soda

1 teaspoon baking soda = 5 grams 1 mole = 6.02×10^{23} particles

gram formula mass of $NaHCO_3$ = 84 grams/mole

dried and powdered rhizome of Zingiber officinale = ginger

5 mL = 1 metric teaspoon

dried and powdered inner bark of Cinnamomum cassia = cinnamon

1 metric teaspoon cinnamon = 2.5 grams

dried and powdered flower-buds of Eugeni

a caryophyllata = ground clove

1 cm^3 = 1 mL

sucrose = table sugar

200 grams sucrose = 1 cup

$^{\circ}C + 273 = \text{Kelvin}$ $5/9(^{\circ}F - 32) = ^{\circ}C$

Conversions:

1 inch = 25.4 mm

1000 = 1 k

Thoughts: Insist on correct number of significant figures for all conversions. The number of significant figures to start should be the same for the final answer.

1st conversion a simple factor label problem:

135 grams ©Crisco x 1 cup/180 grams = 0.750 cups = $\frac{3}{4}$ cup

2nd conversion requires 2 steps:

266 grams dark brown sugar x 1 tablespoon/16.625 g x 1 cup/16 tablespoons = **1.00 cup**

3rd conversion requires 3 steps, 1 conversion from the 2nd conversion:

82.5 grams molasses x 1 teaspoon/6.875 grams / 1 tablespoon/3 teaspoons x 1 cup/16 tablespoons = 0.250 cups = $\frac{1}{4}$ cup

4th conversion: 1 step

50 grams egg x 1 large egg/50 grams = **1 large egg**

5th conversion: 1 step with numbers on both top and bottom

317.25 gram x $\frac{2}{3}$ /94 grams = 2.2500 cups = **2 $\frac{1}{4}$ cups**

6th conversion: Writing formulas, calculating gram formula mass, converting from moles to grams

0.0567 moles NaCl x 58.5 grams/mole x 1 teaspoon / 6.63 grams = 0.500 teaspoons = $\frac{1}{2}$ teaspoon

7th conversion: Many steps, writing formulas correctly, calculating gram formula mass, conversions with scientific notation, use of Avogadro's number.

7.167×10^{22} particles x 1mole/ 6.02×10^{23} particles x 84 grams/1 mole x 1 teaspoon/5 grams = **2.000 teaspoons**

8th -11th conversions: simple conversions using previous conversions

5mL x 1 teaspoon/5mL = **1 teaspoon ginger**

5 grams cinnamon x 1 teaspoon/2.5 grams = **2 teaspoons cinnamon**

1.25 cm³ ground clove x 1mL/cm³ x 1 teaspoon/5mL = 0.250 teaspoons = $\frac{1}{4}$ teaspoon ground clove

100 grams sucrose x 1cup/200 grams = 0.5 cups sucrose = $\frac{1}{2}$ cup sugar

12th conversion: Convert from Kelvin to Celsius to Fahrenheit

$^{\circ}\text{C} + 273 = \text{Kelvin}$ $\frac{5}{9} (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$

450 K = 177 $^{\circ}$ C = 350 $^{\circ}$ F to 2 significant figures

13th Conversion: Convert cm to inches and Convert days into minutes:

304.8 mm x 1 inch/25.4 cm = **12.00 inches**

$4.572 \times 10^{-4} \times 10^3$ m x 1 inches/25.4 x 10^{-3} m = **18.00 inches**

0.007 days x 24 hours/day x 60 minutes/1hour = **10 minutes**