Old Fashioned Fudge

**Prep Time:** 15 Minutes

**Cook Time:** 30 Minutes

**Ready In:** 45 Minutes

**Servings:** 50

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| **Ingredients:**

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| 1/2 cup unsweetened cocoa powder2 cups white sugar | 1/4 teaspoon salt1 tablespoon light corn syrup |

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| 1 cup milk1 tablespoon vanilla extract | 2 tablespoons butter |

**Directions:**

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| **1.** | In a medium saucepan, stir together the cocoa powder, sugar and salt. Mix in corn syrup, and milk until well blended. Add butter, and heat to between 234 and 240 degrees F (112 to 116 degrees C), or until a small amount of syrup dropped into cold water forms a soft ball that flattens when removed from the water and placed on a flat surface. Stir occasionally. |
| **2.** | Remove from heat, and beat with a wooden spoon until the mixture is thick and loses its gloss. Stir in vanilla, and pour into a buttered 9x9 inch baking dish. Let cool until set. Cut into small squares to serve. |

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Carrot Cake

**Prep Time:** 30 Minutes

**Cook Time:** 55 Minutes

**Ready In:** 2 Hours

**Servings:** 15

**Ingredients:**

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| 2 cups white sugar3/4 cup vegetable oil3 eggs1 teaspoon vanilla extract3/4 cup buttermilk2 cups grated carrots1 cup flaked coconut1 (15 ounce) can crushed pineapple,drained | 2 cups all-purpose flour2 teaspoons baking soda2 teaspoons ground cinnamon1 1/2 teaspoons salt1 cup chopped walnuts1/2 cup butter1 (8 ounce) package cream cheese1 teaspoon vanilla extract4 cups confectioners' sugar |

**Directions:**

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| **1.** | Preheat oven to 350 degrees F (175 degrees C). Grease a 9x13 inch baking pan. Set aside. |
| **2.** | In a large bowl, mix together sugar, oil, eggs, vanilla, and buttermilk. Stir in carrots, coconut, vanilla, and pineapple. In a separate bowl, combine flour, baking soda, cinnamon, and salt; gently stir into carrot mixture. Stir in chopped nuts. Spread batter into prepared pan. |
| **3.** | Bake for 55 minutes or until toothpick inserted into cake comes out clean. Remove from oven, and set aside to cool. |
| **4.** | In a medium mixing bowl, combine butter or margarine, cream cheese, vanilla, and confectioners sugar. Blend until creamy. Frost cake while still in the pan. |

Working with Recipes (Stoichiometry in the Kitchen)

After looking at the recipes on the previous page, please try to answer the following questions. Please try to solve the problem using equivalent ratios.

1. If you were going to make the old fashioned fudge but found that you needed to make 75 squares, how much cocoa powder would you need?
2. You look in the fridge and find that you have 2.5 cups of milk left, what is the maximum number of squares that you could make?
3. You are running low on butter and only have 1 tablespoon left, how much white sugar would you need?
4. Carrot cake is my favourite and I want to make enough to serve everyone in this class. Assuming that I need 30 pieces of cake, how many eggs are needed?
5. I grate up all the carrots I have on hand in my kitchen and find that I have 7 cups, how much buttermilk will I need?
6. I’m down to my last cup of vegetable oil, how much ground cinnamon do I need?
7. The can of crushed pineapple that I bought at the store is 24 ounces, how much flour will I need?

Let’s see if there is any difference when we switch back to Chemistry.

1. Chlorine is used by textile manufacturers to bleach cloth.  Excess chlorine is destroyed by its reaction with sodium thiosulfate, Na2S2O3:

Na2S2O3(aq) + 4Cl2(g) + 5H2O(aq) à 2NaHSO4(aq) + 8HCl(aq)

a. How many moles of Na2S2O3 are needed to react with 0.12mol of Cl2?

b. How many moles of HCl can form from 0.12mol of Cl2?

c. How many moles of H2O are required for the reaction of 0.12mol of Cl2?

d. How many moles of H2O react if 0.24mol HCl is formed?

2. The octane present in gasoline burns according to the following equation:
                     2 C8H18 + 25 O2 ---------> 16 CO2 + 18 H2O

a. How many moles of O2 are needed to react fully with 4 moles of octane?
b. How many moles of CO2 can form from 1 mole of octane?
c. How many moles of water are produced by the combustion of 6 moles of octane?
d. If this reaction is to be used to synthesize 8 mole of CO2, how many moles of oxygen are needed? How many moles of octane?

3. The alcohol in "gasohol" burns according to the following equation.
                    C2H6O + 3 O2 --------> 2 CO2 + 3 H2O

a. If 25 moles of ethyl alcohol burns this way, how many moles of oxygen are needed?
b. If 30 moles of oxygen is consumed by this reaction, how many moles of alcohol are used up? How many moles of carbon dioxide are formed?
c. In one test, 23 moles of carbon dioxide was produced by this reaction. How many moles of oxygen were consumed?
d. In another test, 41 moles of water is collected from this reaction. How many moles of alcohol had been consumed? How many moles of oxygen were used up? How many moles of CO2 also formed?