CANADA
4-H Saskatchewan

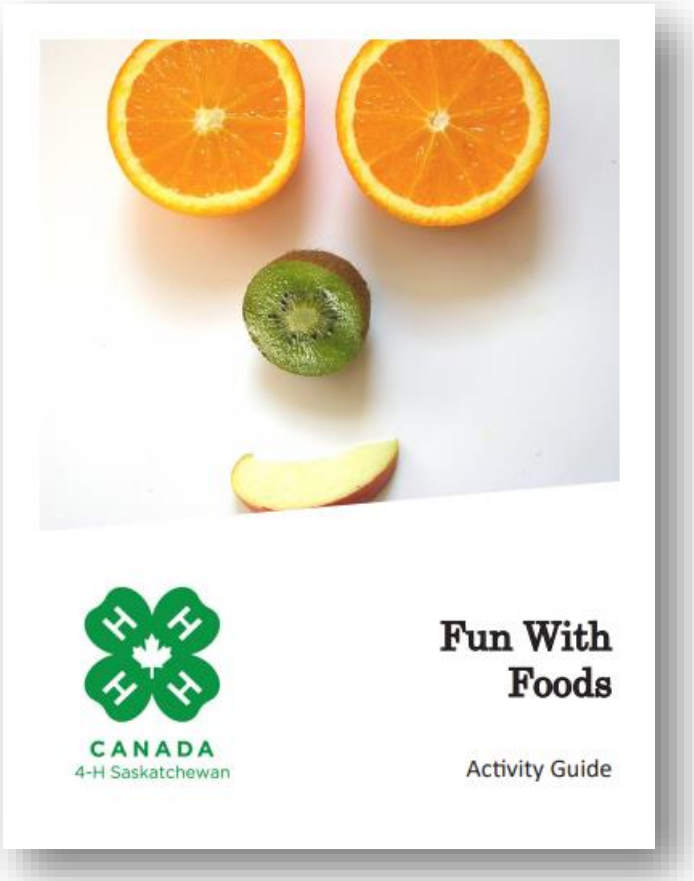
Exploring 4-H at Home

Science and Technology

Pillar: Science & Technology

Project: Food Science *(Previously Fun with Foods)*

Activity: Chemistry Cakes



Chemistry Cakes or Mug Cakes

*** This may require the use of an oven. Have older family members or parents help with this activity

Recommendations:
Bake all your cakes at once to cut down on the total baking time needed.

Materials:

- 4 Mini pie or cake pans
  About a 4 inch diameter
- Baking sheet
- Cooking spray or cake release
- Measuring cups and spoons
- 4 small mixing bowls
- Cup/mug
- Index cards
- Oven mitts

Ingredients:
This makes one mini or one mug cake

- ¼ cup flour
- 3 Tbsp sugar
- ¼ tsp baking powder
- Pinch salt
- 2 Tbsp oil
- ⅓ egg (or 1 Tbsp mayonnaise)
- 1/4 tsp vanilla extract
- 2 Tbsp milk
- 2 Tbsp cocoa powder (optional)

Instructions:

1. Preheat the oven to 350°F
2. Prepare each pan with cooking spray or cake release
3. Prepare each of your cakes (4 times)
   a. Mix all the dry ingredients into a mixing bowl
   b. Add the wet ingredients to the dry ingredients and mix until combined (only use ⅓ the egg!)
   c. Pour the batter into a pan and mark it with an index card according to the list below
   d. Place onto the baking sheet with the other 3 cakes
4. Bake for 15 minutes then remove from the oven and let cool.

How to measure ⅓ egg:

1. Crack your egg into a bowl.
2. Hand whisk the egg until the yolk and white are thoroughly combined.
3. Measure out ⅓ of the total whisked amount, for a large egg measure 1 Tbsp.

Alternatively, you can also make this recipe as a mug cake! All you have to do is mix all the ingredients in a 12oz mug, and microwave for 1 to 1 1/2 minutes until set. You can also substitute the 1/3 egg for 1 Tbsp mayonnaise.

Cake Variations

1: full recipe 2: no oil 3. no egg/mayonnaise 4. no baking powder

Observations:

Cut each cake into pieces for each person to taste. Write down what you see and taste. Do the cakes look different? Do they taste different? Write some notes about each cake as you taste them

Cake 1: Full Recipe

Cake 2: No Oil

Cake 3: No Egg

Cake 4: No Baking Soda

Discussion:

Word bank:

Dry Endothermic Firm Fluffy Light

Fill in the blanks:

1. Baking powder produces tiny gas bubbles when heated. This helps the cake be

   _____ and _____.

2. Heat causes the proteins in eggs to change. This makes the cake _____.

3. Putting oil in the cake keeps the liquid molecules safe. This means the cake will not

   _____ out.

4. When something gives off heat it is called an exothermic reaction. When something

   takes in heat it is called an _____ reaction.

Circle one:

1. Cakes have an *endothermic* or *exothermic* reaction.
2. Cakes baked at a lower temperature would take *longer* or *shorter* to finish baking in the oven?

Further discussion:

1. What do you think would happen if we didn't add sugar to the cake?

_____

_____

_____

_____