

# Food Explorations Lab II: Label Logic

## STUDENT LAB INVESTIGATIONS

Name: \_\_\_\_\_

### Lab Overview

In this investigation, your group will use the information on Nutrition Facts labels of two potato chip products to determine which one provides the best nutrition for your body. You will calculate the mass of each macronutrient in three servings of the chips, measure these masses using *representative* ingredients, and convert the measured amounts to a common household volume measurement (teaspoons). You will also calculate the calories in the foods that are from each macronutrient (i.e. fat, carbohydrate, protein).

### Lab Objectives

*In this lab, you will learn how to...*

1. Read a Nutrition Facts label.
2. Compare and contrast the nutritional differences between two snacks based on calories, carbohydrate, fat, sugar, sodium, and fiber content.
3. Select healthier food choices using Nutrition Facts labels.

**Lab Safety: Before beginning ANY investigation you should put on your safety goggles and apron. Always wash your hands following completion of an investigation. When handling food, you should also wash your hands prior to beginning an investigation.**

### Lab Question

According to the Nutrition Facts label, which snack (Classic Potato Chips or Baked Potato Chips) has the best nutrition profile?

**Prediction:** The \_\_\_\_\_ chips have the best nutrition profile because...

# Understanding Food Label Measurements & Weights

## MATERIALS

- 1 small cup of salt (*represents sodium*)
- 1 small cup of sugar (*represents carbohydrates*)
- 1 small cup of softened butter (*represents saturated fat*)
- 1 small cup of olive oil (*represents unsaturated fat*)
- 1 set of measuring spoons
- 1 triple beam balance
- 4 small empty cups

## PROCEDURE

1. Read the Nutrition Facts labels below.

### SNACK #1: CLASSIC POTATO CHIPS

Nutrition Facts	
Serving Size 1 oz.	
Amount Per Serving	
<b>Calories 150</b>	Calories from Fat 90
% Daily Value	
<b>Total Fat</b> 10g	<b>16%</b>
Saturated Fat 1g	<b>6%</b>
<u>Polyunsaturated Fat 4.5g</u>	
<u>Monounsaturated Fat 4.5g</u>	
Trans Fat 0g	
<b>Cholesterol</b> 0mg	<b>0%</b>
<b>Sodium</b> 180g	<b>7%</b>
<b>Potassium</b> 330g	<b>9%</b>
<b>Total Carbohydrate</b> 15g	<b>5%</b>
Dietary Fiber 1g	<b>4%</b>
Sugars 0g	
<b>Protein</b> 2g	

### SNACK #2: ★ BAKED POTATO CHIPS

Nutrition Facts	
Serving Size 1 oz.	
Amount Per Serving	
<b>Calories 120</b>	Calories from Fat 30
% Daily Value	
<b>Total Fat</b> 3g	<b>5%</b>
Saturated Fat 0.5g	<b>3%</b>
Polyunsaturated Fat 1.5g	
Monounsaturated Fat 1g	
Trans Fat 0g	
<b>Cholesterol</b> 0mg	<b>0%</b>
<b>Sodium</b> 160g	<b>7%</b>
<b>Potassium</b> 290g	<b>8%</b>
<b>Total Carbohydrate</b> 21g	<b>7%</b>
Dietary Fiber 2g	<b>8%</b>
Sugars 2g	
<b>Protein</b> 2g	

## TEACHER EDITION

2. Find Total Calories, Total Carbohydrates (grams), and Total Fat on each label. Calculate their amounts for 3 servings and record your findings in Table A. (*HINT*: Multiply each by 3.)
3. Draw a circle around *Serving Size* on each Nutrition Facts label.
4. Draw a square around *Saturated Fat* on each Nutrition Facts label.

- a. How much *Saturated Fat* is in 3 servings of each snack? Record this number of grams in Table B.
- b. Use the balance and measure the mass of an empty plastic cup. Add the calculated mass of *Saturated Fat* to the mass of the cup.

Mass of cup \_\_\_\_\_ g + Mass of Saturated Fat \_\_\_\_\_ g =

Total Mass of Saturated Fat \_\_\_\_\_ g

- c. Place the riders on the balance to equal the Total Mass. Add the softened butter (representing *Saturated Fat*) to the plastic cup until the scale balances.
- d. Measure the gram amount of 3 servings of *Saturated Fat* using measuring spoons (teaspoon). Record your findings in Table B.

**NOTE:** Softened butter is being used to represent *Saturated fat* in this investigation, however butter is only one type of saturated fat in the diet. Some other sources include tropical oils (palm and coconut).

5. Underline the *Unsaturated Fats* on the Nutrition Facts label for the Classic Potato Chips.

- a. How many grams of *Unsaturated Fats* are in 3 servings of each snack? Record this number of grams in Table B.

**NOTE:** You should choose foods that have higher amounts of unsaturated fats compared to saturated fats. In general, unsaturated fats are healthier than saturated fats.

- b. Use the balance and measure the mass of an empty plastic cup. Add the calculated mass of *Unsaturated Fat* to the mass of the cup.

Mass of cup \_\_\_\_\_ g + Mass of Unsaturated Fat \_\_\_\_\_ g =

Total Mass of Unsaturated Fat \_\_\_\_\_ g

- c. Place the riders on the balance to equal the Total Mass. Add the olive oil (representing *Unsaturated Fat*) to the plastic cup until the scale balances.
- d. Measure the gram amount of 3 servings of *Unsaturated Fat* using measuring spoons (teaspoon). Record your findings in Table B.

**NOTE:** Olive oil is being used to represent unsaturated fat in this investigation, however olive oil is only one type of unsaturated fat in the diet. Some other sources include canola and soybean oils, flaxseeds and walnuts.

4. Draw a triangle around *Sodium* on each Nutrition Facts label.

- a. Measure the Recommended Daily Allowance (RDA) (2,300 mg) for *Sodium*. Use the balance and salt (representing *Sodium*) to measure the appropriate number of grams. You will first need to convert milligrams to grams. Record your finding in Table B.

- b. Use the balance to measure the mass of an empty plastic cup. Add the calculated mass of sodium to the mass of the cup.

$$\text{Mass of cup} \text{ _____ g} + \text{Mass of Sodium} \text{ _____ g} =$$

$$\text{Total Mass of Sodium} \text{ _____ g}$$

- c. Place the riders on the balance to equal the Total Mass. Add the salt (representing sodium) to the plastic cup until the scale balances.
- d. Measure the gram amount of *Sodium* using measuring spoons (teaspoon). Record your finding in Table B.

**NOTE:** Salt is being used to represent sodium in this investigation, however salt is only 40% sodium and 60% chloride.

5. Draw a circle around *Sugars* on each Nutrition Facts label.

- a. How much *Sugar* is in 3 servings of each snack? Record this number of grams in Table B.
- b. Use the balance and measure the mass of an empty plastic cup. Add the calculated mass of sugar to the mass of the cup.

$$\text{Mass of cup} \text{ _____ g} + \text{Mass of Sugar} \text{ _____ g} = \text{Total Mass of Sugar} \text{ _____ g}$$

- c. Place the riders on the balance to equal the Total Mass. Add the sugar to the plastic cup until the scale balances.
- d. Measure the gram amount of 3 servings of *Sugar* using measuring spoons (teaspoon). Record your finding in Table B.

**NOTE:** Table sugar is being used to represent all sugar in this investigation; however table sugar is only one type of sugar in the diet. Some other sources include candy, corn syrup, honey, jam or jelly, soda, fruit juices, and ketchup. On the Nutrition Facts label, Sugars can also include natural sources from fruits, olives, grains and dairy foods. To find added sugar, look at the ingredients list. Ingredients like corn syrup, high-fructose corn syrup, fruit juice concentrate, maltose, dextrose, sucrose, honey, maple syrup, and cane sugar are considered added sugars.

6. Draw a star next to the Nutrition Facts label with the most *fiber*.

## TEACHER EDITION

Table A: Total Calories, Carbohydrates, and Fat

	Snack #1: Classic Potato Chips	Snack #2: Baked Potato Chips
Calories	<u>450</u> calories	<u>360</u> calories
Carbohydrate	<u>45</u> grams	<u>63</u> grams
Fat	<u>30</u> grams	<u>9</u> grams

Table B: Saturated Fat, Unsaturated Fat, Sugar, and Sodium

	Snack #1: Classic Potato Chips	Snack #2: Baked Potato Chips
Saturated Fat	<u>3</u> grams <u>0.6</u> tsp	<u>1.5</u> grams <u>0.3</u> tsp
Unsaturated Fat	<u>27</u> grams <u>5.5</u> tsp	<u>7.5</u> grams <u>1.5</u> tsp
Sugar	<u>0</u> grams <u>0</u> tsp	<u>6</u> grams <u>2</u> tsp

**HINT:** To obtain total grams Unsaturated fat, you will need to add Polyunsaturated fat (grams) and monounsaturated fat (grams).

**TEACHER'S NOTE:** Numbers in the tables above are estimates only. The values your students obtain may vary.

## Conclusion:

1. Calculate the calories from total carbohydrates for 3 servings for each label. Use the grams of *Total Carbohydrate* found on the food labels. (*HINT*: There are 4 calories for each gram of carbohydrate.)

$$\text{Label 1.} \quad 45 \quad \times \quad 4 \quad = \quad 180$$

$$\text{Label 2.} \quad 63 \quad \times \quad 4 \quad = \quad 252$$

2. Calculate the calories from total fat in 3 servings for each label. Use the grams of *Total Fat* found on the food labels. (*HINT*: There are 9 calories for each gram of fat.)

$$\text{Label 1.} \quad 30 \quad \times \quad 9 \quad = \quad 270$$

$$\text{Label 2.} \quad 9 \quad \times \quad 9 \quad = \quad 81$$

3. Calculate the calories for *Saturated Fat* in 3 servings for each label. Use the grams of saturated fat found on the food labels. (*HINT*: There are 9 calories for each gram of fat.)

$$\text{Label 1.} \quad 3 \quad \times \quad 9 \quad = \quad 27$$

$$\text{Label 2.} \quad 1.5 \quad \times \quad 9 \quad = \quad 13.5$$

Which product has more calories from fat?

**Label 1 - Classic Potato Chips**

## TEACHER EDITION

4. Calculate the calories from sugar in 3 servings for each label. Use the grams of sugar found on the food labels. (*HINT: There are 4 calories for each gram of carbohydrate.*) *Show your work.*

Label 1.      0      x      4      =      0

Label 2.      6      x      4      =      24

Which product has more calories per serving from sugar?

**Label 2 - Baked Potato Chips**

5. Calculate how many teaspoons of saturated fat are in 3 servings for each snack. Use the density of butter to estimate saturated fat. There are approximately 4.5 grams of butter in a teaspoon. *Show your work.*

Label 1:

$$3 \text{ servings} \times 1\text{g} = 3\text{g}$$

$$\frac{3\text{g}}{4.5\text{g}} = \frac{2}{3} \text{ tsp}$$

Label 2:

$$3 \text{ servings} \times 0.5\text{g} = 1.5\text{g}$$

$$\frac{1.5\text{g}}{4.5\text{g}} = \frac{1}{3} \text{ tsp}$$

6. Calculate how many teaspoons of unsaturated fat are in 3 servings for each snack. There are approximately 4.5 grams of olive oil in a teaspoon. *Show your work.*

Label 1:

$$3 \text{ servings} \times 9\text{g} = 27\text{g}$$

$$\frac{27\text{g}}{4.5\text{g}} = 6 \text{ tsp}$$

Label 2:

$$3 \text{ servings} \times 2.5\text{g} = 7.5\text{g}$$

$$\frac{7.5\text{g}}{4.5\text{g}} = 1 \frac{2}{3} \text{ tsp}$$

7. Calculate how many teaspoons of sugar are in 3 servings for each snack. There are approximately 4 grams of sugar in 1 teaspoon. *Show your work.*

Label 1:

$$3 \text{ servings} \times 0\text{g} = 0\text{g}$$

$$\frac{0\text{g}}{4\text{g}} = 0 \text{ tsp}$$

Label 2:

$$3 \text{ servings} \times 2\text{g} = 6\text{g}$$

$$\frac{6\text{g}}{4\text{g}} = 1 \frac{1}{2} \text{ tsp}$$



## TEACHER EDITION

8. Do your calculations match your measurements in Table B?

YES

NO

Why? Explain any differences.

Answers may differ due to human error and the use of using "representative" food materials versus measuring exact amounts of fat, sugar, and sodium present in food.

9. Use the Nutrition Facts labels to complete the chart below. Draw an "X" next to the best answer.

**Which snack option is the best option if you wanted to...**

	Classic Potato Chips	Baked Potato Chips
...Reduce Total Fat Intake		X
...Reduce Saturated Fat Intake		X
...Reduce Sodium Intake		X
...Reduce Sugar Intake	X	
...Increase Fiber Intake		X

10. Referring to the chart above, which snack has the best nutrition profile? Explain.

Baked chips have the best nutrition profile because they have less total fat, saturated fat, and sodium compared to regular chips and more fiber than regular chips.