Visualizing Calories:
Energy in a Cheeto vs. a Marshmallow

VIDEO: https://youtu.be/UcKkqGworPo

INTRODUCTION:
Nutrition labels are located on all food packages. These labels inform customers of important information about the food item being consumed. For example, a nutrition label states how many servings are in one package. Take a look at the food labels below. There are approximately 15 servings in one package of marshmallows. How many servings are in one package of Cheetos?

_____ servings in one package of Cheetos

Another fact on a nutrition label is the amount of calories per recommended serving. A calorie is a unit of energy. The more calories a food item has, the longer it takes to burn and the more energy it provides. However, when a person eats more calories than needed, the energy gets stored as fat for later use. Take another look at the food labels below. There are 80 calories in one serving of marshmallows. How many calories are in one serving of Cheetos?

_____ calories in one serving of Cheetos

Finally, nutrition labels also denote the major macromolecules - carbohydrates, lipids (fats), and proteins - present in the food item being consumed. Macromolecules are essential for most, if not all, cellular processes in organisms. For this lab specifically, carbohydrates are responsible for short-term energy in cells, while lipids (fats) are responsible for long-term energy in cells. As a result, carbohydrates should have less calories to burn than lipids (fats) because they provide short-term energy. Take one more look at the food labels below. Marshmallows contain 8% carbohydrates and 0% lipids per serving. What percentage of carbohydrates and lipids do cheetos contain per serving?

___% carbohydrates in one serving of Cheetos ___% lipids in one serving of Cheetos

Nutrition Label #1: Cheeto

Nutrition Label #2: Marshmallow

PURPOSE:
To validate nutrition labels and visualize how carbohydrates & lipids affect the burning of calories.

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PROCEDURE:

1. Weigh the initial masses of one Cheeto and one marshmallow. Record on appropriate data table.
2. Expand a paper clip and stick it upright into a cork plug. Stand the structure up, and stick the Cheeto on top of the other end of the paper clip.
3. Use the grill lighter to fully light the Cheeto. Start the timer and describe what the fire looks like in the appropriate data table.
4. Stop the timer when the Cheeto stops burning. Record the burning time in the appropriate data table.
5. Weigh the final mass of the burnt Cheeto and record in the appropriate data table.
6. Calculate the change in mass for the Cheeto. Record in the appropriate data table.
7. Repeat steps 2-6 for the marshmallow.


MATERIALS RECEIPT
PRICES ARE APPROXIMATE

Cheetos Puffs (3oz)	$1.50
Marshmallows (10oz)	$1.00
Small Digital Scale	$8.00
Paper Clips	$1.00
Cork Plugs	$5.50
Grill Lighter	$1.00
Phone Timer	N/A
TOTAL	$18.00

DATA/OBSERVATIONS:

Table 1: **Record** the initial and final masses of the Cheeto and marshmallow.

Food Item	**Initial Mass (g)**	**Final Mass (g)**	**Change in Mass (g)** Final Mass - Initial Mass
Cheeto			
Marshmallow			

Table 2: **Record** the burning time of the Cheeto and marshmallow.

Food Item	**Burning Time (s)**
Cheeto	
Marshmallow	

Table 3: **Describe** characteristics of the fires of the Cheeto and marshmallows.

Food Item	**Description of Fire**
Cheeto	
Marshmallow	

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CONCLUSION:

1. Using the nutrition labels above, **determine** which table is the Cheeto and which is the marshmallow:

Carbohydrates	Lipids (Fats)
Yes	Yes

=

Carbohydrates	Lipids (Fats)
Yes	No

=

2. **Explain** the differences between the Cheeto's fire and the marshmallow's fire. Does this align with the nutrition label? Why or why not?

3. Using change in mass and burning time, are the nutrition labels accurate? Use evidence collected to **justify** your answer.