A Light Lunch? – A Problem Based Learning Assignment in Calorie Counting

"Look at this pair of jeans. Don't you think I will look good in it?" asked Kendra.

"They suit you. Go try them on, girl," encouraged Shanay.

Kendra went into the changing room. She emerged a few minutes later wearing a pair of jeans that was unbuttoned and clinging to her body. "What do you think?" she asked.

"Nice… Maybe a bigger size, though. Everyone is now going for baggy clothes," Shanay suggested diplomatically.

"No, this is my size! I'll lose a few pounds and they'll fi t perfectly," Kendra countered adamantly.

"OK, take them. Anyway, I'm getting hungry, let's grab something to eat," Shanay suggested.

"There is a place next door we can get something quick. Let's have a light lunch so that we can pig out at Duane's party tonight. I just love the Caribbean food he serves!" Kendra replied.

"I'll order. What do you want?" Shanay asked.

"I love cheeseburgers! I gotta watch my weight and my cholesterol level now. Looks like the pounds came on over winter. What are you having? I'll follow your example, skinny girl," Kendra observed.

"A flatbread sandwich, a bag of baked chips, and an iced tea," Shanay replied.

"A diet ice tea, I bet," remarked Kendra.

"Nah, artificial sweeteners taste awful," Shanay replied.

"Yeah, nothing like the real stuff. I'll have the same, but I want a warm sandwich. A chicken and cheese Panini, a bag of regular chips, and a strawberry smoothie for me," Kendra requested.

As they sat down to eat, Kendra looked around at the other diners and observed. "Crowded huh; salads seem to be popular today."

"Yeah, that time of the year. Doesn't hurt to lose the few pounds gained over winter—swimsuit season coming up," Shanay surmised.

"Looks like I have to do that too. You know, I tried several times to lose weight but it is so hard," confessed Kendra.

"Yeah, I know it's tough," agreed Shanay.

Adapted from "A Light Lunch?" by Dewprashad and Vaz. Originally published October 28, 2010. National Center for Case Study Teaching in Science, University at Buffalo, State University of New York.

“Look at that lady with the two kids in the corner table. Her plate is piled high with mac & cheese, but she’s is so thin. Some people can load up on fats and never put on weight,” observed Kendra.

“For class I was reading that we all have different metabolic rates; our hormone levels, weight, muscle mass, age and other factors determine how many calories we burn. To keep the same weight we have to eat about the same amount of calories we burn up. Calories are not the only thing to watch. You do watch your cholesterol intake and that’s great. Trans fats and saturated fats aren’t good either. Although that lady is skinny, the mac & cheese is not a healthy choice, it has a lot of saturated fat and maybe even trans-fat,” Shanay counseled.

Kendra nodded in agreement and then shifted the conversation to news about mutual friends during the rest of the meal. All the talk about diet and calories was making her feel depressed.

“That was good,” Shanay observed as they got up to leave.

Kendra complained. “Yeah. You know, I wish I had as high a metabolic rate as you. Then I could enjoy food like you do. We eat about the same amount but I’m so much bigger than you. I always feel guilty after I’ve eaten something that I really love.”

“Don’t worry so much. We walked for about thirty minutes in the mall. I am sure we burned up about half of the calories we just ate,” said Shanay.

“We walked more like forty minutes. I bet we burned up all the calories we ate. We should come to the mall and window shop more often. It is much more fun than working out in a gym,” said Kendra.

Later that evening, Kendra was unpacking her shopping bag and decided to try on the jeans once again. She inhaled deeply and contracted her stomach as she cautiously put the jeans on. They still didn’t fit! She gave them an upwards tug and exhaled in relief as the jeans moved up to her waist. However, despite all her eff orts, she could not button them. She wondered how much weight she had put on since she last weighed herself. She unearthed the bathroom scale, climbed on it, and closed her eyes as she saw the needle racing across the scale. After a while, she opened her eyes and peered down at the needle. She exhaled in relief as it settled at the 200 lb mark. She plucked up enough courage to measure her waist. Her jaw dropped as she noticed the measurement.

“Ninety one inches? Can’t be!” she exclaimed. As she looked closely, she noticed she had used the side of the tape that gave measurements in centimeters. She sighed in relief, turned over the tape, and re-measured her waist.

“Aha! Thirty four inches; not bad for someone who is 5 feet 4 inches and has a big bone structure. But I still have to lose a few pounds. I’ll give up sugar from my diet until I lose 20 pounds, starting tomorrow. Tonight though is time for jerk chicken and rum cake!”

Adapted from “A Light Lunch?” by Dewprashad and Vaz. Originally published October 28, 2010. National Center for Case Study Teaching in Science, University at Buffalo, State University of New York.

Questions

1. Use the information below to determine the amount of calories in the food consumed by Kendra and Shanay. Did Kendra follow Shanay's example and consume a similar amount of calories during their "light" lunch? The caloric values of carbohydrates, fats, and proteins are 4, 9, and 4 kcal/g respectively.

Kendra's lunch

Menu item[1]	Chicken and Mozzarella Panini	Potato Chips	Strawberry Smoothie	Total (g or mg)	Energy (kcal)
Amount	Whole Sandwich	1 bag	Medium 16 fl oz		
Carbohydrates	86g	17g	60g		
Dietary Fiber	5g	1g	2g		
Sugar	8g	0g	58g		
Protein	46g	2g	7g		
Total Fat	24g	8g	1.5g		
Saturated Fat	7g	0.5g	1g		
Trans Fat	0g	0g	0g		
Cholesterol	85 mg	0g	5mg		
Sodium	2150 mg	170mg	100mg		
	Kendra's Total Calorie Intake =				

Shanay's lunch

Menu item	Mediterranean Chicken Flatbread Sandwich	Baked Potato Chips	Iced Tea	Total (g or mg	Energy (kcal)
Amount	1 flatbread	1 bag	Medium 20 fl oz		
Carbohydrates	37g	25g	33g		
Dietary Fiber	4g	2g	0g		
Sugar	4g	1g	33g		
Protein	9g	2g	0g		
Total Fat	11g	2.5g	0g		
Saturated Fat	6g	0.5g	0g		
Trans Fat	0g	0g	0g		
Cholesterol	45mg	0mg	0g		
Sodium	550mg	150mg	65mg		
	Shanay's Total Calorie Intake =				

[1] Menu items and nutritional information from Panera Bread® - https://www.panerabread.com/content/dam/panerabread/documents/nutrition/Panera-Nutrition.pdf

Adapted from "A Light Lunch?" by Dewprashad and Vaz. Originally published October 28, 2010. National Center for Case Study Teaching in Science, University at Buffalo, State University of New York.

2. Kendra is 200 lb. and Shanay is 150 lb. An average person of 150 lb. walking at a rate of 3 miles per hours burns about 270 Calories per hour while an average person of 200 lb. burns about 360 Calories per hour. Did either Kendra or Shanay "burn off" the Calories consumed with the walk they took? Assume that they walked at an average speed of 3 miles per hour for 40 minutes.

Hint: $$40\ minutes\ \times \frac{1\ hour}{60\ minutes} \times \frac{calories\ burned}{hour} = total\ calories\ burned$$

3. For a female aged 19–30 with a sedentary lifestyle such as Kendra and Shanay, the estimated daily caloric need is 2000 Calories. What percentage of this did they consume during lunch? Would you recommend a very large dinner for them if they wanted to restrict themselves to their caloric needs and they each had a breakfast of about 600 calories?

Hint: $$\frac{lunch\ calories}{daily\ calorie\ need} \times 100 = \%\ of\ daily\ calories\ consumed$$

4. Body mass index (BMI) is a measure of body fat based on height and weight that applies to adult men and women. BMI is calculated by dividing body weight (in kilograms) by the square of the body height (in meters). The categories of BMI according to the National Institutes of Health are: Underweight = <18.5; Normal weight = 18.5–24.9; Overweight = 25–29.9; and Obesity = BMI of 30 or greater. In which category will you place Kendra?
Hint: You can use this BMI calculator to help answer this question.

5. How much weight does Kendra need to lose in order to be at a healthy weight?

6. It is recommended that one consume less than 10 percent of calories from saturated fats. Does the saturated fat content of the meal consumed by Kendra fall within these guidelines?

Hint: $$\frac{lunch\ calories\ from\ saturated\ fat}{total\ lunch\ calories} \times 100 = \%\ of\ calories\ from\ saturated\ fat$$

7. It is recommended that one consume less than 300 mg/day of cholesterol. Is the amount of cholesterol in Kendra's meal at an acceptable level? Explain your answer.

8. The American Heart Association recommends that adults consume no more than 1,500mg of sodium per day. Is the amount in Kendra's meal at an acceptable level? Explain your answer.

9. What advice would you give to Kendra about the health risks associated with her weight?

Adapted from "A Light Lunch?" by Dewprashad and Vaz. Originally published October 28, 2010. National Center for Case Study Teaching in Science, University at Buffalo, State University of New York.