

Relating Chronic Diseases and Nutrition

Pre-Lab Discussion

During your teens, you will grow at a faster rate than at any other time in your life except infancy. This growth involves more than just height and weight. Your bones increase in density, and your muscles develop in size and strength. Your endocrine glands also grow and develop. Good eating habits are especially important during this period of rapid growth.

A well-balanced diet definitely contributes to a healthy body. Yet many teenagers do not have good eating habits. They may skip breakfast, choose snacks that are rich in fats and sugars, go on crash diets, and neglect foods that contain important nutrients. For most Americans, improper nutritional habits cause health problems.

Good eating habits during the teenage years usually mean fewer problems during later years. Scientists have begun to take a closer look at the relationship between nutrient intake and chronic, life-threatening diseases. Heart disease, diabetes, high blood pressure, kidney disease, various digestive disorders, and even certain types of cancer have all been found to be connected with nutrition. It is becoming more and more evident that “you are what you eat.”

In this investigation, you will plan nutritionally balanced menus and calculate the number of Calories you consume and burn in an average day.

Problem

Can you plan a menu that meets the Recommended Dietary Allowances (RDA) published by the Food and Nutrition Board of the National Academy of Sciences? How closely does your Calorie consumption equal the Calories you burn?

Materials (*per group*)

Calculator (optional)
Pencil
Additional tables of nutrition information (optional)

Procedure

1. From the foods listed in the Table of Nutrition Information, plan a day's menu. Choose those items you would like to eat for breakfast, lunch, dinner, and snacks. List them in the chart entitled “My Menu” in Observations. Also list the nutrition information for each item.
2. Total each column in your menu chart. Compare the totals with the data in the Recommended Dietary Allowances Table.

Recommended Dietary Allowances

Sex	Age	Calories	Protein (g)	Calcium (mg)	Iron (mg)	Vitamins		
						A (i.u.)	B ₁ (mg)	C (mg)
Males	12-16	2700-3000	46-54	1200	18	5000	1.4	50-60
Females	12-16	2100-2400	44-48	1200	18	4000	1.1	50-60

g = grams, mg = milligrams, i.u. = international units

Table of Nutrition Information

Food	Amount	Calories	Protein (g)	Calcium (mg)	Iron (mg)	Vitamins		
						A (i.u.)	B ₁ (mg)	C (mg)
Hamburger	113 g	300	20.2	11	3.1	40	.09	0
Hot dog or hamburger bun	1	90	2.5	22	0.6	trace	.08	trace
T-bone steak	227 g	800	30.0	16	4.4	150	.12	0
Fried chicken	¼	230	22.4	18	1.8	230	.07	0
Egg	11 g	80	6.5	27	1.2	590	.15	0
Flounder	100 g	70	14.9	61	0.8	—	.06	—
Bacon	1 slice	50	1.8	1	0.2	0	.04	0
Hot dog	1	125	7.0	3	0.6	0	.08	0
Shrimp	0.2 kg	145	28.3	26	1.8	—	—	—
American cheese	28 g	105	7.0	198	0.3	350	.01	0
Milk	1 cup	160	9.0	288	0.1	350	.07	2
Ice cream	1 cup	255	6.0	194	0.1	590	.05	1
Lima beans	½ cup	130	8.0	28	2.9	—	.12	—
Green beans	½ cup	15	1.0	31	0.4	340	.05	8
Broccoli	1 stalk	25	3.1	88	0.8	2500	.09	90
Corn	1 ear	70	3.0	2	0.5	310	.09	7
Blackeyed peas	½ cup	90	6.5	20	1.7	280	.02	14
Baked potato	1 med.	145	4.0	14	1.1	trace	.15	31
French fries	20	310	4.0	18	1.4	trace	.14	24
Potato chips	20	230	2.0	16	0.8	trace	.08	6
Apple	1 med.	80	0.3	10	0.4	120	.04	6
Banana	1 med.	100	1.0	10	0.8	230	.06	12
Fresh strawberries	½ cup	35	0.5	14	0.6	80	.02	16
Orange juice	1 cup	120	2.0	25	0.2	550	.22	124
White bread	1 slice	65	2.0	22	0.6	trace	.06	trace
Chocolate chip cookie	1	50	0.5	4	0.2	10	.01	trace
Chocolate cake	1 piece	235	3.0	41	0.6	100	.02	trace
Corn flakes	1 cup	95	2.0	6	0.5	0	.10	0
Pancake	1	105	3.2	27	0.6	54	.08	trace
Syrup	1 Tbsp.	50	0	33	0.6	0	—	0

3. The number of Calories you burn depends in part on the activities you perform. Fill in the chart entitled "My Activities" with the time you spend during an average day on each activity listed.
4. To calculate the total Calories burned in each activity category, multiply $A \times B \times C$. Keep the time units the same within each category. For example, if time is spent in hours, use the figure for Calories burned per hour. Add the categories to find the total Calories burned in 24 hours.

Observations

My Menu

Meal	Calories	Protein (g)	Calcium (mg)	Iron (mg)	Vitamins		
					A (i.u.)	B ₁ (mg)	C (mg)
Breakfast							
Lunch							
Dinner							
Snacks							
TOTALS							

My Activities

Activity	A Calories Burned (per hr or min)	B Minutes or Hours Spent in Activity	C Your Mass	Total Calories
Sleeping Napping	.0075/min .45/hr			
Reading Watching TV Eating Sitting in class	.0108/min .64/hr			
Dressing Showering Driving car	.015/min .90/hr			
Light activity Walking Lab work	.0308/min 1.84/hr			
Moderate activity Gym class Bicycling Dancing Easy jogging	.0395/min 2.37/hr			
Heavy work Swimming Tennis Basketball Wrestling Climbing stairs	.0483/min 2.9/hr			

1. Compare your total Calories burned in 24 hours with the total Calories you would consume according to the menu you planned in step 2 of the Procedure.

Calories burned: _____

Calories consumed: _____

Analysis and Conclusions

1. a. How do the totals from your menu chart compare with the Recommended Dietary

Allowances? _____

- b. Does your menu provide too many, too few, or the right number of Calories?

c. In what areas, if any, is your menu deficient? _____

2. Not all of the recommended nutrients have been included in the charts for this investigation. Name four other nutrients, including minerals and vitamins, that should be included in your diet. _____

3. What portion of a gram is 1 milligram? _____

4. Compare your total Calories burned in 24 hours with your total Calories consumed. If this is your normal pattern, what conclusion can you draw regarding your Calorie intake? _____

5. List three diseases and disorders that have been associated with poor nutrition. _____

Critical Thinking and Application

1. What two things can you do to safely lose weight? _____

2. Of the two weight-loss methods you listed in question 1, which do you think is the better method and why? _____

3. Many companies now advertise breakfast cereals that are lower in sugar. Why do you think it is better to eat a breakfast cereal that is lower in sugar? _____

4. Explain how it is possible for a person to appear overweight but suffer from malnutrition.

Going Further

1. Keep a record of all foods you eat every day for one week. Compute your Calorie intake each day. Compute your average daily Calorie intake for the week. How well does your list of foods eaten meet the Recommended Dietary Allowances? Is your daily food intake well balanced in terms of the four basic food groups? What conclusions can you draw regarding your eating habits?
2. Many food products have nutritional information listed on the package. Look at this information for some of your favorite foods. How well do these foods meet the requirements for Recommended Dietary Allowances?
3. Obtain nutrition information for the major items sold at your favorite fast-food restaurant. Make a chart or booklet of this information and share it with your classmates.