



## FUNCTIONS Project 4

# How many calories do you burn each day?

**The calories our bodies obtain** from food are either stored as fat or burned for energy. The more physically active a person is, the more calories he or she will use. You can expect to use far more calories running a marathon than if you watched a marathon on TV while stretched out on the couch. This project will help your students to understand the relationship between calories and physical activity.

Consider using this project as a follow-up for Project 3, "Charting Your Calories."

### Goal

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Working individually, students will record their physical activities throughout the day for a seven-day period. They will tally their daily caloric expenditures and find their average caloric expenditures. They will then summarize their results in a written report.

*Suggested time:* Two to three class periods.

## Math Skills to Highlight

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1. Collecting and organizing data
2. Using estimation and decimal computation
3. Calculating with units of time
4. Finding the mean
5. Using writing and math as a way to share ideas
6. Using technology in problem solving

## Special Materials/Equipment

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Reference books that contain the numbers of calories used during specific physical activities; calculators. *Optional:* A scale for students to weigh themselves (however, keep in mind that some students might be sensitive about their weight; do not require that students weigh themselves in school); computers for Internet access for research.

## Development

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Consider working with your students' physical education or health teacher for this project. They will undoubtedly be able to offer advice, suggestions, and information. Before beginning the project, explain to your students that our bodies use the calories in food for fuel. Our bodies burn (or use through chemical change) calories for energy. Excess calories are stored as fat.

- Start the project by telling your students that they will be required to maintain records of their physical activities for the next seven days. They will then find a caloric value for each activity. Multiplying this by their weight and the time they spend at the activity will give them the approximate total number of calories they used.
- Hand out copies of Student Guide 4.1, and review the information with your students. Emphasize that they are to maintain a record of all the physical activities they do each day for seven days.
- Distribute copies of Data Sheet 4.2, "Caloric Expenditure and Physical Activities." Review the material with your students. Make sure that they understand how to use the formula for finding the total number of calories burned for specific activities. To use the formula, students will need to know their weight. You might provide a scale in class or suggest that students weigh themselves at home or in the gym. *A word of caution here:* Be sympathetic to the feelings of students who might be sensitive about their weight. Allow these students the option of weighing themselves outside class.

- Point out that the caloric values on the data sheet are approximations. Although different sources give slightly different values, most fall within the same range.
- Emphasize that although the data sheet provides a variety of activities, it is likely that some activities will not be listed. In such cases students should consult exercise or physical activity books in the school or public library or online sources. Since the data sheet provides so many activities, research time should be minimal. Encourage students to consult references on their own time.
- If you wish, you may distribute copies of Worksheet 4.3, which students can use to chart their activities and caloric expenditures. If you decide to use this worksheet, you will need to photocopy at least seven pages per student. Stapling them together reduces the chances that students will lose individual pages. Make additional sheets available for students who need more. If you prefer, suggest that students design their own charts.
- Although students will monitor their activities for seven days, you might want to give a nine- or ten-day deadline for completion of the charts. If students miss a day, they can make it up the next day.
- On completion of their charts, students are to find their total caloric expenditures for each day and their daily average caloric expenditures.
- When they are done, they are to write a report, summarizing their findings.

## Wrap-Up

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Discuss the relationship between calories and physical activities. Once again, keep in mind that some students might be sensitive about their weight and caloric intake.

## Extension

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Invite a personal fitness trainer to speak to your class about the importance of exercise.

## STUDENT GUIDE 4.1

# How Many Calories Do You Burn Each Day?



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## ***Situation/Problem***

Physical activity burns calories. But do you know how many calories you burn each day? This project will help you find out. You will keep track of your activities for seven days. Based on the time you spend in each activity, you will calculate the total number of calories you used for the activity. You will then find the total number of calories you expended each day.

## ***Possible Strategies***

1. Use a chart to record the activities you perform each day.
2. Be as accurate as you can in recording activities and times.

## ***Special Considerations***

- Record every activity you do from the time you wake up in the morning to the time you go to sleep. Also be sure to record your sleep time.

# How Many Calories Do You Burn Each Day? (Cont'd.)

- Along with each activity, record the length of time you were involved with it. Convert times to decimal equivalents based on 1 hour. For example, a half-hour would be 0.5, and 15 minutes would be 0.25.
- Try to record activities as you do them. If this is impossible, at the end of the day, review all the things you did and write them down on your chart. It is important to record each activity.
- Use Data Sheet 4.2 to find values for caloric expenditures. For activities not on this sheet, consult reference books or online sources. Even then, you may need to estimate some activities.
- If you must estimate the calories used during some activities, select similar activities, and base your estimations on them.
- To use the formula on Data Sheet 4.2, you will need to know your weight. If you are not sure and do not have access to a scale, use an estimate.
- Use a calculator to find the total number of calories used during specific activities.
- Total all the calories spent on all the activities for each day.
- Analyze your results and consider the following questions:
  - Are you more active during the week or on weekends?
  - What activities do you expend the most calories on? The least?
  - Do you think your average caloric expenditure will be about the same throughout the year, or do you think it will vary? Explain your answer.
  - Did your results surprise you in any way? Explain.
- Write a report summarizing your findings. Be sure to write clearly, use an opening, a body with supporting details, and a conclusion.

## **To Be Submitted**

1. Chart of physical activities and caloric expenditure
2. Summary report

## DATA SHEET 4.2

# Caloric Expenditure and Physical Activities

Below are various activities and estimates of the amount of calories you would burn each hour for each pound you weigh while taking part in an activity. You can find an estimate of your caloric expenditure by using this formula:

$$\text{Your weight} \times \text{calories per hour per pound} \times \text{time} = \text{Total calories}$$

Suppose you weigh 120 pounds and mow the lawn for an hour and a half. You would multiply  $120 \times 2.7 \times 1.5$ , which equals 486 calories. By mowing the lawn for an hour and a half, you would have used 486 calories, roughly equal to that hamburger and French fries you gulped down for dinner.

In the following list, the number following the activity is the calories per hour per pound you would burn during the activity.

Badminton—2.7	Keyboarding—0.8
Baseball—2.9	Lying at ease—0.6
Basketball—4.5	Mowing the lawn—2.7
Boxing—4.5	Marching (rapid)—3.9
Canoeing (leisurely)—1.2	Playing drums—1.8
Card playing—0.7	Playing flute—1.0
Chopping wood (ax)—2.3	Playing piano—1.1
Cleaning (house)—1.6	Playing trumpet—0.9
Cooking—1.3	Playing violin—1.3
Cycling—2.5	Racquetball—4.0
Dancing (ballroom)—1.6	Raking leaves—2.3
Dancing (current hits)—2.8	Rowing machine—3.1
Eating—0.8	Shoveling snow—3.9
Fishing—1.7	Sitting—0.6
Football—4.4	Skating—2.8
Gardening—2.1	Skiing (cross-country)—3.7
Golf (walking)—2.3	Skiing (downhill)—2.5
Gymnastics—3.7	Sleeping—0.4
Hiking—3.6	Soccer—3.7
Horseback riding—2.7	Swimming—3.8
Ironing—0.9	Tennis—2.5
Jogging (distance)—4.2	Walking—2.2
Judo (vigorous) 4.3	Weight training—1.9
Jumping rope—3.8	Writing—0.8

