

Chapter 3 Project: No Sweat!

Beginning the Chapter Project

Your good health and physical fitness will enhance your quality of life for years to come. As you grow older, your needs will change. How much exercise should you get? What should your blood pressure be? You can use formulas and inequalities to describe many aspects of good health.

As you work through the activities, you will use formulas related to physical fitness and health. You will work with equations and inequalities that allow for differences in weight, height, and age. Finally, you will design an exercise plan.

Activities

Activity 1: Calculating

To determine how many calories you burned during a given physical activity, you need to know three things:

1. your body weight in kilograms
To convert pounds to kilograms, divide your body weight by 2.2:

$$\text{weight in kilograms} = \frac{\text{weight in pounds}}{2.2}$$

2. the amount of time you performed the activity
3. the rate of energy expenditure expressed in METS

The table below shows the rate of energy expenditure for selected activities.

MET Value Table	
Exercise	MET Value
Aerobics: general	6
Biking: leisure	4
Running (6 mph) (10 minute mile)	10
Running (8 mph) (7.5 minute mile)	13.5
Freestyle swimming: light/moderate	8
Tennis: moderate	7
Walking (3.5 mph)	4

To find the number of calories burned during a given activity, use the formula:

$$\text{calories expended} = \text{body weight (kg)} \times \text{MET value} \times \frac{\text{time (in minutes)}}{60}$$

- Find how many calories a 130-pound person expends walking for 45 minutes.
- Find how many calories you would burn doing one of the exercises listed for 50 minutes four times per week.

Chapter 3 Project: No Sweat! (continued)

Activity 2: Researching

Systolic blood pressure, the higher number in a blood pressure reading, is measured as your heart muscle contracts. The inequality $P \leq \frac{1}{2}a + 110$ gives the normal systolic blood pressure P based on age a (in years).

- Find your normal systolic blood pressure.
- At age 30, does 125 represent a *maximum* or *minimum* systolic pressure? Explain.

Activity 3: Writing

When you exercise, your pulse rate rises. Recommended pulse rates vary with age and physical condition. For vigorous exercise such as jogging, the inequality $0.7(220 - a) \leq R \leq 0.85(220 - a)$ gives a target range for pulse rate R (in beats per minute) based on age a (in years).

- In what range should your pulse rate be when you are jogging?
- What is the target range for a person 15 years old?
- Why should you see a doctor before starting an exercise program? Interview a health professional and design your own exercise plan.

Finishing the Project

The answers to the three activities should help you complete your project. Put all your information for the project in a folder. Is your exercise plan realistic for your available time and resources? How close is it to what you already do? (If it is very different, you should begin only with an adult's guidance.) Be sure to include what you have learned about blood pressure and exercise.

Reflect and Revise

Organize your folder, making sure you have included all equations and inequalities used in each activity. Share your folder with an adult. Check your work for accuracy and look for any areas that are not clear. Make any changes necessary in your work.

Extending the Project

Research cross-training techniques or the training programs used to prepare for an Olympic sport.