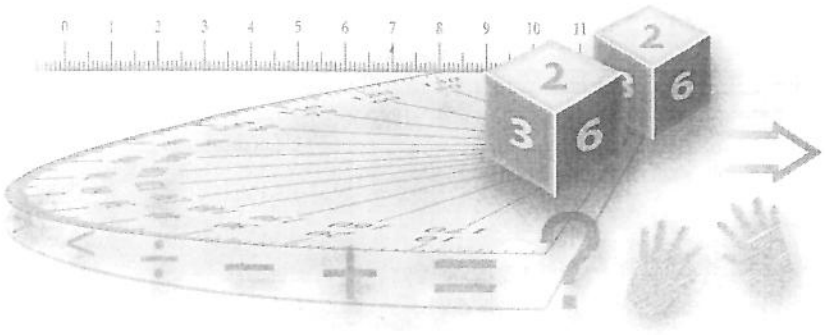

ALGEBRA
Project 57

Buying a car

As early as middle school, many students look forward to the day they will be able to drive. Few, however, think about the responsibilities and expenses that come with driving. This project enables students to see the costs related to buying and owning a car.

Goal

Working individually, students will assume that they are shopping to buy a car. They will read advertisements about cars and select a model that they feel best suits their needs and budget. Students will calculate the expense of buying and owning the car, including financing, operating, and maintenance costs. At the end of the project, they will explain their selection and their anticipated costs during a class discussion. *Suggested time:* Two class periods, although students will likely spend time outside class researching information about cars.

Math Skills to Highlight

1. Anticipating and estimating costs
2. Tallying various cost factors
3. Understanding the terms *financing, principal, annual percentage rate (APR), finance charge, down payment,* and *monthly payments*
4. Using a formula to find the finance charge on a loan
5. Making decisions based on cost
6. Using technology in problem solving

Special Materials/Equipment

Calculators; the classified and automotive sections of local newspapers. *Optional:* Articles comparing the values of specific cars in such publications as *Consumer Reports* and *Car and Driver;* computers with Internet access for research; an overhead projector and transparencies for presentations.

Development

Ask your students how many of them expect to own a car someday. If you teach high school, perhaps some of your students already do. Of those who do not, most will enthusiastically raise their hands. Now ask if they have ever thought about the overall costs associated with owning and operating a car. Most probably have not. Aside from the obvious costs such as purchase price, gas, and maybe insurance, most students fail to anticipate the actual costs of car ownership.

- Begin the project by explaining that students will work individually and imagine that they are ready to buy a car. Knowing their financial status (or anticipating what their finances are likely to be), they are to select a car that fits their budget and their needs.
- Explain that students should look through the automotive and classified sections of local newspapers to find a car they realistically can afford. Ask students a few days before the project to bring in those parts of newspapers from home. If you also start collecting materials ahead of time, you should have plenty for the project.
- Publications such as *Consumer Reports* and *Car and Driver* often contain articles about cars. Students may wish to consult these and similar resources to find information about the cars they are considering. If such publications are not available in your school library, your local library may have them. You might also suggest that students consult online sources where they will find substantial information on cars.

- Distribute copies of Student Guide 57.1, and review the information with your students. Especially review the steps necessary for finding the approximate finance charge and monthly payments for car loans. You may need to provide your students with some examples.
- Discuss the terms *financing, principal, annual percentage rate, finance charge,* and *monthly payments.*
- Hand out copies of Data Sheet 57.2, "Car Costs." Review the material with your students, and point out that the costs listed on the sheet are estimates and will vary around the country. Students may use the costs on the data sheet for this project. If students own cars and are already familiar with the costs, they should use the actual expenses.
- Hand out copies of Worksheet 57.3, "A Car Buyer's Cost Sheet." Explain that students are to list and tally all of their expenses on the worksheet.
- Remind students to be prepared to discuss their selection and anticipated costs on completion of the project. You may suggest that they use an overhead projector in their presentations. They can make a transparency of Worksheet 57.3 to share their results.

Wrap-Up

Conduct a class discussion in which students share the information they compiled on their worksheets.

Extension

Suggest that students compare leasing a car to buying one. What are the advantages of each method? What are the disadvantages? Provide class time for students to discuss their findings.

Name Project Due Date

STUDENT GUIDE 57.1

Buying a Car

Situation/Problem

You are to imagine that you are shopping for a car. You are trying to buy a car that meets your needs but also satisfies your financial status. In selecting a car, you are to calculate your overall anticipated expenses, including the purchase price, finance charge (if any), and operating and maintenance costs. On completion of this project, be prepared to explain your choice to the class.

Possible Strategies

1. Consider the type of car you would like.
2. Consider your financial condition. Be realistic. Choose a car that you think you can afford.
3. Consult automotive and classified advertisements in trying to find a car that will satisfy your needs and remain within your budget. You may also consult online sources for information.

Buying a Car *(Cont'd.)*

Special Considerations

- Are you interested in a new or used car? New cars cost more.
- Use search terms such as "new cars" and "used cars" to find sites about cars.
- Will you pay cash for your car, or will you need to obtain a loan? Financing your car (taking a loan) allows you to put down less cash, but you will need to make monthly payments that include interest. Interest will increase the cost you pay for the car. You can find the approximate finance charge you would have for a loan by using the following formula:

$$\text{Finance Charge} = \frac{A(N + 1)(APR)}{2P}$$

A = amount of money borrowed (principal)
N = total number of payments
APR = annual percentage rate (interest; for this project use an APR of 7%)
P = number of payments per year

- After you find the approximate finance charge, add it to the amount of your loan. This is how much money you will need to pay back. Now divide this total by the number of payments. The answer equals the amount of your monthly payments. To find the amount of your total payments for each year of the loan, simply multiply your monthly payments by 12. (A loan for one year will have 12 payments. A two-year loan has 24, a three-year loan has 36, and a four-year loan has 48. The longer you take a loan, the lower your monthly payments will be. However, your finance charge will be greater.)
- Carefully review the information and costs on Data Sheet 57.2. Use this information for calculating your operating and maintenance expenses.
- Use Worksheet 57.3 to list and total your costs. Remember to find the yearly cost of operating and maintaining your car.
- Be prepared to discuss your choice of car and anticipated costs with your class after the project is finished.

To Be Submitted

Your worksheet.

Name _____

DATA SHEET 57.2

Car Costs

Following are common expenses in operating and maintaining a car. Include the ones that apply to your car on Worksheet 57.3. Note that the costs are estimates and will vary for different parts of the country.

- Payment for any loan, including finance charges.
- Insurance (for a new driver):

  Small car, $2,000 per year

  Midsized car, $2,300 per year

  Sports car, $3,000 per year

  SUV, $3,400 per year
- Fees for license and registration, $75.
- Gasoline. Use $2.99 per gallon for estimating your fuel costs. To find your estimated cost for gas for the year, do the following:

  Estimate the total number of miles you expect to drive for the year. You can estimate each week's total miles and multiply by 52.

  Divide the total number of miles by the car's rated mpg (miles per gallon). If you do not know the mpg of your car, use these estimates: small car, 40 mpg; midsized car, 25 mpg; sports car, 22 mpg; SUV, 20 mpg.

  Multiply this answer by the cost of gasoline.
- Costs for tune-ups, oil changes, and maintenance:

  Small car, $250 per year

  Midsized car, $450 per year

  Sports car, $650 per year

  SUV, $700 per year
- Include any additional costs such as CD player, enhanced interior, sun roof, or special tires or wheels.

Name _____

WORKSHEET 57.3

A Car Buyer's Cost Sheet

List all of the expenses you expect in purchasing, operating, and maintaining the car of your choice. Operating and maintenance costs should be totaled for the year.

Model and Year of Car _____

Purchase Price $_____

Operating and Maintenance Costs

Description of Expense	Cost
Total Yearly Cost	