from data TO DECISION

Critical Thinking: Does the fuel-saving device work?

Inset Industries manufactured a device called the Inset Fuel Stabilizer, which supposedly increased car fuel economy. The $89.95 device is installed in the fuel line of a car so that the engine will experience "improved fuel mileage and performance." The Environmental Protection Agency tested the device using a standard highway fuel economy test and results (mi/gal) are shown below (based on data from the report EPA420-R-99-016). The table values are measures from tests repeated on three different cars.

	Before Device Was Installed			After Device Was Installed			
Chevrolet	38.5	38.0		36.8	36.8		
Ford	37.7	37.9	38.2	38.1	38.1	37.9	38.1
Pontiac	35.1	34.8	35.1	34.8	34.6	34.4	34.5

Analyzing the Results

a. Use one-way analysis of variance with the mi/gal measures from the After column only. What do the results tell us? Do the results tell us whether the device is effective in improving fuel mileage? In this situation, is analysis of variance the best method to use?

b. Use any appropriate method to determine whether the Inset Fuel Stabilizer device is effective in improving fuel mileage. Write a brief report summarizing your findings and include specific statistical tests and results.

Cooperative Group Activities

1. In-class activity Divide the class into three groups. One group should record the pulse rate of each member while remaining seated. The second group should record the pulse rate of each member while standing. The third group should record the pulse rate of each member immediately after standing and sitting 10 times. Analyze the results. What do the results indicate?

2. In-class activity Ask each student in the class to estimate the length of the classroom. Specify that the length is the distance between the chalkboard and the opposite wall. On the same sheet of paper, each student should also write his or her gender (male/female) and major. Then divide into groups of three or four, and use the data from the entire class to address these questions:

- Is there a significant difference between the mean estimate for males and the mean estimate for females?
- Is there sufficient evidence to reject equality of the mean estimates for different majors? Describe how the majors were categorized.
- Does an interaction between gender and major have an effect on the estimated length?
- Does gender appear to have an effect on estimated length?
- Does major appear to have an effect on estimated length?

3. Out-of-class activity The *World Almanac and Book of Facts* includes a section called "Noted Personalities," with subsections composed of architects, artists, business leaders, military leaders, philosophers, political leaders, scientists, writers, entertainers, and others. Design and conduct an observational study that begins with choosing samples from select groups, followed by a comparison of life spans of people from the different groups. Do any particular groups appear to have life spans that are different from the other groups? Can you explain such differences?