A reaction time is how long it takes to do something (such as step on the brakes) after you receive a certain signal (such as seeing a child start across the street in front of you). Reaction times vary from one person to the next. Reaction times, from one measurement to the next, also vary for the same person.

Activity 1: Comparing Reaction Time

Problem Statement

Measure the reaction time for stopping a meter stick that falls between your thumb and forefinger. Calculate measures of central tendency, make a frequency distribution table, and create a histogram.

Procedure

1. One person should hold the meter stick at the 100 cm end. Another person (whose reaction time is being measured) should place a hand at the bottom of the stick with thumb and forefinger each two centimeters away from either side of the 0 cm mark. When the person holding the meter stick drops it, the other person, looking only at the bottom of the stick, catches the stick as quickly as possible by pressing thumb and forefinger together around the stick.

2. The length of the meter stick from the 0 cm end to the “catch point” is related to the elapsed time from the moment of “drop” to the moment of “catch.” Use this length as a measure of the reaction time. For each drop, read the millimeter mark that is just visible above the thumb. A lower reading (75 mm) represents a faster reaction time than a higher reading (92 mm).

3. Have each member of the group catch three drops. Record the meter stick readings for each drop in millimeters.

4. When all groups have completed their measurements of reaction times, write the meter stick readings for the entire class on the chalkboard. These readings become the data set for the class.
Divide the reaction times for the class data into five or six convenient intervals (for example, 100–149 mm, 150–199 mm, 200–249 mm, and so on). Make a frequency distribution table, and create a histogram of the class data.

Determine the mode and the median of the reaction times for the entire class. Find the mean of the class data.

Compare your group data to the class histogram.

Activity 2: The Missing Birthdate

Problem Statement
Find the unknown number from a data set when the mean and all other data values are known.

Equipment
Small note cards

Procedure
1. Work with a group of four or five students. Each student should “encode” his or her birth date by multiplying the number representing the month by 100 and adding the day of the month. For example, for a birth date of March 9, the code will be 309. For a birth date of October 26, the code will be 1026.

2. Each group member should write his or her code on a note card. Calculate the mean, to the nearest hundredth, of the birth date codes for your lab group.

3. Write the mean on a note card and label the card “mean”.

4. Remove one encoded birth date card from the set. Place the “mean” card on the top of stack of cards.

5. Trade the stack of cards with another lab group. Retain the removed card with your lab group and set it aside.

6. Using the mean and known data values in the set, calculate the missing data value.

7. “Decode” the data value to determine the unknown birth date. Verify that date with the lab group from which you received the stack of cards.
As a group, explain how to find a missing data value when the mean is known and all other data values are known.

Apply what you learned about missing data values to solve the following problem.

Your scores on four math tests were 85, 83, 88, and 91. To retain a ‘B’ average, you need to have an average of at least 86. What is the minimum test score you must achieve on the fifth and final test to retain your ‘B’ average? On the fifth test, what score do you have to achieve to earn a ‘B+’ average of 89?

Discuss the sentences written in Step 8 and as a class select the one that best describes the process used to solve the problems.

**Activity 3: Using Technology to Create Statistical Graphs**

**Problem Statement**

You will collect data about the different ways teenagers spend their days.

Collect data from four of your classmates. Enter the data into a spreadsheet to create a table. Then make at least two different types of graphs for the data.

**Equipment**

Spreadsheet software application

**Procedure**

1. List four ways you pass your time while at home, such as watching TV or reading.
2. Ask four classmates how many hours they spend each day on each of the activities named in Step 1.
4. Set up five columns, one for each activity and one column for students’ names. Make four rows, one for each student.
5. Enter the data into the appropriate cells in your file.
6. Use the spreadsheet program to create a bar graph. In the *Insert* menu, select *Object*. You will see illustrations of the different types of graph. Click on the type of bar graph you want to create.
Follow the prompts to title your graph and axes. A sample bar graph is shown above.

Use the spreadsheet to create a circle graph. In the *Insert* menu, select *Object*. Click on the type of graph you want to create.

Follow the prompts to title your graph and axes. A sample circle graph is shown.

Compare the two different graphs you created. Even though each was made with the same data, they look quite different. By looking at the graphs only, do they show the same information? Explain.

Write a question that can be answered by looking at the bar graph.

Write a question that can be answered by looking at the circle graph.

Which graph displays all the individual data in the table?

Which graph displays how parts of the data relate to the whole?

Which graph can you use to quickly rank the four activities in the order of most time spent to least time spent for your four classmates? What is the ranking?

Describe how each graph could change if you increased the number of rows in the table, and listed all the students in your class with their responses.