Name _____ Class _____ Date _____

Chapter 2 Project: The Big Dig!

Beginning the Chapter Project

Your bones tell a lot about your body. Archaeologists and forensic scientists study bones to estimate a person's height, build, and age. These data are helpful in learning about ancient people and in solving crimes. The lengths of major bones, such as the humerus, radius, and tibia, can be substituted into formulas to estimate a person's height.

As you work through the activities, you will collect data from your classmates and from adults. You will use formulas to analyze the data and predict heights. Then you will decide how to organize and display your results in graphs and spreadsheets.

List of Materials

- Calculator
- Tape measure or ruler
- Graph paper

Activities

Activity 1: Graphing

In this activity, you will collect, graph, and analyze data.

- Measure the length of your radius bone to the nearest half inch.
- Collect the measurements taken by your classmates. (Note whether each measurement is that of a male or a female for Activity 3.) Display the data in a graph.
- Write a description of the data.

Activity 2: Calculating

Scientists use the formulas in the table at the right to approximate a person's height H, in inches, when they know the length of the tibia t, the humerus h, or the radius r.

- Use your tibia, humerus, and radius bone lengths to calculate your height. Are the calculated heights close to your actual height? Explain.
- An archaeologist found an 18-inch tibia on the site of an American colonial farm. Do you think it belonged to a man or woman? Why?
- Choose one radius measurement from the data you collected for Activity 1. Calculate the person's height. Can you tell whose height you have found? Explain.

Male
$H = 32.2 + 2.4t$
$H = 29.0 + 3.0h$
$H = 31.7 + 3.7r$
Female
$H = 28.6 + 2.5t$
$H = 25.6 + 3.1h$
$H = 28.9 + 3.9r$

Chapter 2 Project: The Big Dig! (continued)

Activity 3: Analyzing

When predicting height, scientists use different formulas for men and women.

- Review the data collected in Activity 1. Organize the data by male and female.
- Organize and display the data to see if there are differences between the heights of males and females.

Activity 4: Creating

In this activity, you will analyze data from adults.

- Measure the tibia, humerus, and radius bones, and the heights of several adults to the nearest half inch. Create a spreadsheet to organize the measurements. Use the formulas from Activity 2 in your spreadsheets to predict the heights of the adults.
- Compare the predicted heights with the measured heights. Does one of the formulas predict height better than the other formulas? Explain.

Finishing the Project

The answers to the four activities should help you complete your project. Assemble all the parts of your project in a folder. Include a summary of what you have learned about using the height formulas. What difficulties did you have? Are there ways to avoid these problems? What advice would you give to an archaeologist or forensic scientist about predicting heights from bone lengths?

Reflect and Revise

Ask a classmate to review your folder with you. Together, check that your graph is clearly labeled and accurate. Check that you have used formulas correctly and that your calculations are accurate. Is your spreadsheet well organized and easy to follow? Make any revisions necessary to improve your work.

Extending the Project

Archaeologists and forensic scientists use many other formulas related to the human body. Research formulas of this type by contacting your local police department or by searching the Internet.