ACTIVITY 4B: DETERMINATION OF BONE DENSITY WITH BONE SPECIMENS

STUDENT DIRECTIONS

Problem: How does the density at the ends of a long bone compare to the density of the mid-section of the shaft?

Hypothesis:

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Materials: (for a group of 2 to 4 students)

- graduated cylinder with an interior diameter that will accommodate the bone sections
- 250 ml beaker
- bone sections cut from a long bone (such as cattle, sheep, or deer)
- triple beam balance
- hand lens or dissecting scope
- dissecting gloves
- 2 different color markers

Procedure for Bone Density Lab:

1. Read the problem to be investigated. Write a hypothesis.
2. Weigh each dry bone section to determine its **mass** in grams.
3. Record the mass in the group data collection table.
4. Determine the **volume** of each bone specimen by the displacement method.
   a. Measure 50 ml of water in the graduated cylinder. (This amount may need to be changed to accommodate the size of the bone section.)
   b. Place the bone section in the graduated cylinder.
   c. Record the amount of water displaced from the specimen (original level of water minus the level of water with the bone section = volume of water displaced = volume of the bone section).
5. Calculate the **density** of the bone specimen. Density = mass/volume = grams/ml.
6. Record the density of each specimen cut on your group data collection sheet.
7. Have one member of the lab group record the group's results on the teacher transparency for the class' data.
8. Record the class' results on your class data collection sheet.
9. Using a color of your choice, make a line graph of the class' average densities for each group's bone specimen on the graph sheet. Make a color key and label the line "Class Bone Density Averages."
10. Make another line graph of your group's density values for each of the 10 specimen cuts on the same graph sheet you just used. Use a different color from the one in step 9 and label the line "Group Bone Density."
11. Answer the analysis questions.