**Inferring Height based on Long Bone Length**

This activity will need to be entered into your journal using the title above and today’s date. Both members of the team should have this entered in your journal for credit. This is a participation grade worth 20 points. If all components of the activity, including answers to each question are in your journal, you will get full credit. Partially completed labs will receive no credit. Stay on task and stay at your desk.

Your upper leg contains a large, single bone called the femur. This long bone

stretches from the hip (pelvis) socket to the kneecap (patella). The length of

this bone can be used to roughly estimate a person's height. To increase

accuracy of this bone-to-height relationship, you will also need to know both

the gender and race of the individual. These factors affect the relationship

between long bone length and the individual's height.

**OBJECTIVE**

This activity page will offer an experience in estimating height using long bones of the body.

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**PROCEDURE**

**Part 1-Inferring Height from Femur Length**

1. Work with a partner. Identify the placement of your partner's femur

bone. It is the single large bone that extends from the hip socket to the

kneecap.

2. Use a meter stick or measuring tape to determine the approximate

length of this bone (in centimeters).

3. Multiple the length of the femur by 2.6.

4. Add 65 to this number to arrive at the approximate height of your

partner in centimeters.

5. Use a metric ruler to obtain the actual height of your partner in

centimeters.

6. If you'd like to see these two numbers in inches, convert this metric

measurement by dividing by 2.54.

7. Switch roles.

**Analyzing Your Results**

1. How accurate were you in inferring height from femur length? Explain.

2. Were factors such as gender and race taken into account in this

computation? Explain.

3. How might the accuracy of this calculation be improved?

**Part 2-Inferring Height from Humerus Length**

1. Work with a partner. Identify the placement of your partner's humerus

bone. It is the single large bone that extends from the elbow to the shoulder socket.

2. Use a meter stick or measuring tape to determine the approximate

length of this bone (in centimeters). If the bone comes from a female

subject, go to step 3, If the bone comes from a male subject, go to step 5.

If the bone comes from a male subject, go to step 5.

3. If the bone comes from a female, multiply the measured length in centimeters by 3.06.

4. Add 64.26 to this number. This final number is the approximate height

of the female based upon her humerus length.

5. If the bone comes from a male, multiply the measured length in

centimeters by 32.69.

6. Add 59.41 to this number. This final number is the approximate height

of the male based upon his humerus length.

7. Again, if you'd like to convert this numbers into inches, divide the result

by 2.54.

8. Switch roles.

**Analyzing Your Results**

1. How accurate were you in inferring height from humerus length? Explain.

2. Were factors such as gender and race taken into account in this

computation? Explain.

3. How might the accuracy of this calculation be improved?

**Part 3-Inferring Height from Tibia Length**

1. Work with a partner. Identify the placement of your partner's tibia bone.

It is the larger central bone of the lower leg, extending from just below the kneecap to the ankle.

2. Use a meter ruler or measuring tape to determine the approximate

length of this bone (in centimeters).

3. Use the chart below to estimate the height of your partner based upon

the tibia length. This regression chart uses only three racial stocks,

Caucasoid, Negroid and Mongoloid.

**Caucasoid male** (2.42) (tibia length in centimeters) + 81.93

**Caucasoid female** (2.90) (tibia length in centimeters) + 61.53

**Negroid male** (2.19) (tibia length in centimeters) + 85.36

**Negroid female** (2.45) (tibia length in centimeters) + 72.56

**Mongoloid male** (2.39) (tibia length in centimeters) + 81.45

**NOTE:** Mongoloid is the major ethnic group that includes Chinese, Japanese,

Eskimos, Native Americans, Siberians, Malayans, and Mongolians.

**Analyzing Your Results**

1. What was an advantage in using the tibia method for determining

height?

2. What were the disadvantages for using the tibia method for determining

height?

3. Were factors such as gender and race taken into account in this

computation? Explain.