Equations and Archaeology

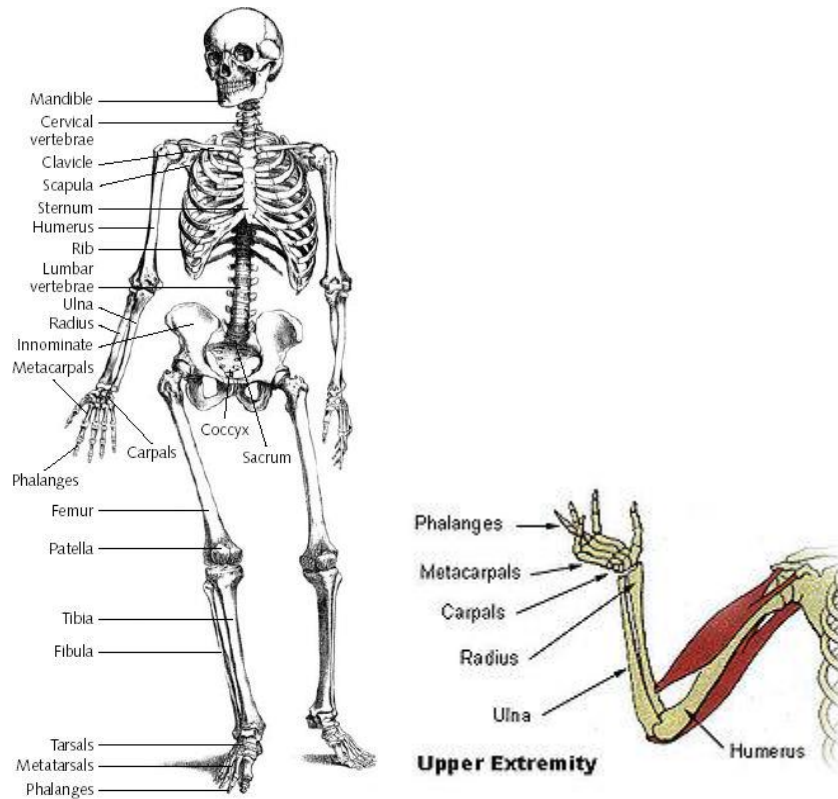Name _____ Date _____

Archaelogists are detectives who solve mysteries. The items they unearth provide clues about the people that once lived in a region. For example, archaeologists can measure the length of bones to determine approximate heights of people.

Over the years, archaeologist have come up with a way to determine the height of a human being using the length of the humerous bone.

For males, where h represents the lengh of the humerous in centimeters:

$$m = 2.9h + 70.6$$

For females, where h represents the length of the humerous in centimeters:
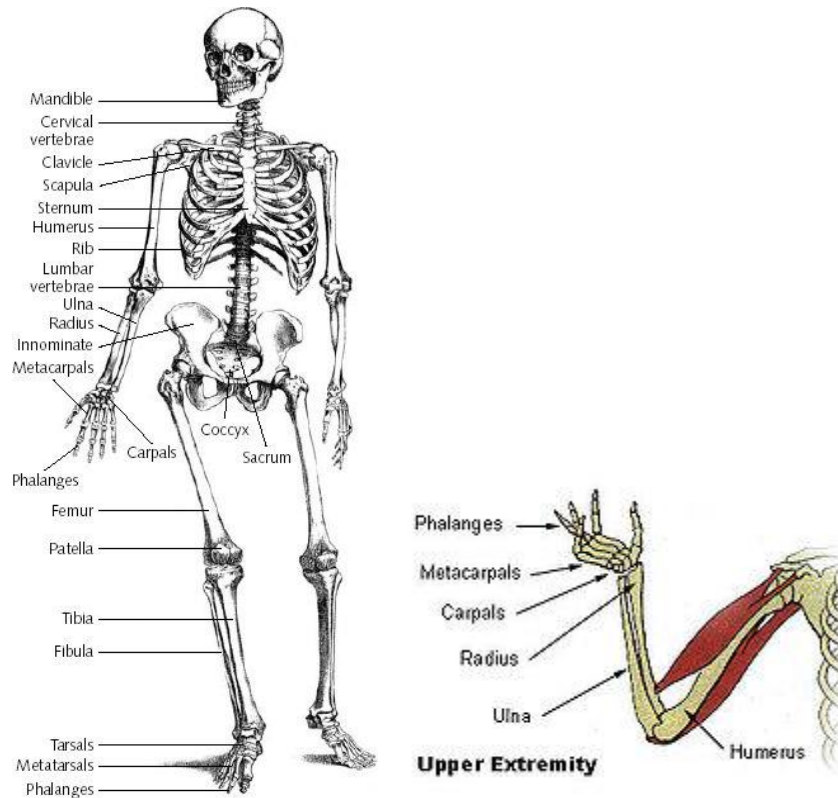
$$f = 2.8h + 74.8$$

How could you convert these measurements in inches?

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Activity 1.

1. Measure the length of your humerous in centimeters. To do this, measure from your elbow to the edge of your shoulder.

2. Use the given equation to estimate your height in inches.

3. How accurate is this estimate? Why might your estimate be off?

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Activity 2:

Pretend that you are an archaeologist. You have received the data below from a dig in Casas Grandes, northern Mexico. Casas Grandes (or Paquimé) was a large, influential capital city in the state of Chihuahua, northern Mexico, considered the third great regional state (the others are Aztec and Toltec) of the American Southwest from about AD 1150-1450.

You have been given the following chart:

Skeleton	Length of Humerus (cm)
Male 1	32
Female 1	29.5
Male 2	28.5
Female 2	?
?	24.5

Use the given equation for questions 1-4.

1. Find the estimated height of Male 1 in inches.

2. Find the height in inches of Female 1 and Male 2.

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3. Suppose the height of Female 2 is 142 cm. How long is the length of her humerous bone?

4. The person listed in the bottom row of the chart was 134 cm tall. Is it more likely that this person was a male or a female? Support your answer with data and calculations.

ANSWER KEY

Archaelogists are detectives who solve mysteries. The items they unearth provide clues about the people that once lived in a region. For example, archaeologists can measure the length of bones to determine approximate heights of people.

Over the years, archaeologist have come up with a way to determine the height of a human being using the length of the humerous bone.

For males, where *h* represents the lengh of the humerous in centimeters:

$$m = 2.9h + 70.6$$

For females, where *h* represents the length of the humerous in centimeters:

$$f = 2.8h + 74.8$$

How could you convert these measurements in inches? *Divide by 2.54, because there is 2.54 cm in 1 inch.*

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Activity 1.

1. Measure the length of your humerous in centimeters. To do this measure from your elbow to the edge of your shoulder. Use the given equation to estimate your height in inches.
2. How accurate is this estimate?
3. Why might your estimate be off? *Measurement errors, error in the formula, keep in mind that the multiplying factor and the addition are averages.*

Activity 2:

Pretend that you are an archaeologist. You have received the data below from a dig in Casas Grandes, northern Mexico. Casas Grandes (or Paquimé) was large, influential capital city in the state of Chihuahua, northern Mexico, considered the great regional state (the others are Aztec and Toltec) of the American Southwest from about 1150-1450.

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?	24.5

Use the given equation for questions 1-4.

Complete the following problems. Round your answers to the nearest tenth.

1. Find the estimated height of Male 1 in inches.

$$2.9(32) + 70.6 = 163.4 \; cm$$

$$\frac{163.4}{2.54} \approx 64.3 \; in$$

2. Find the height in inches of Female 1 and Male 2.

Female 1 - $2.8(29.5) + 74.8 = 157.4 \; cm$ Male 2 $2.9(28.5) + 70.6 = 153.25$

$\frac{157.4}{2.54} \approx 62 \; in$ $\frac{153.25}{2.54} \approx 60.3 in$

3. Suppose the height of Female 2 is 142 cm. How long is the length of her humerous bone?

$$2.8(x) + 74.8 = 142$$

$$2.8(x) + 74.8 - 74.8 = 142 - 74.8$$

$$\frac{67.2}{2.8} = 24cm$$

4. The person listed in the bottom row of the chart was 134 cm tall. Is it more likely that this person was a male or a female? Support your answer with data and calculations.

Female – $2.8(x) + 74.8 - 74.8 = 134 - 74.8$ Male - $2.9(x) + 70.6 - 70.6 = 134 - 70.6$

- $\frac{59.2}{2.54} \approx 23.3cm$ $63.4/2.54 \approx 25cm$

Accept any reasonable answer that uses the data/calulations accurately.