Name: _____ Date: _____

NO BONES ABOUT IT

When a body is discovered, it is important to learn as much as possible from the remains. Forensic anthropologists use mathematical formulas to estimate someone's height from the lengths of certain bones in their body. But where do these formulas come from?

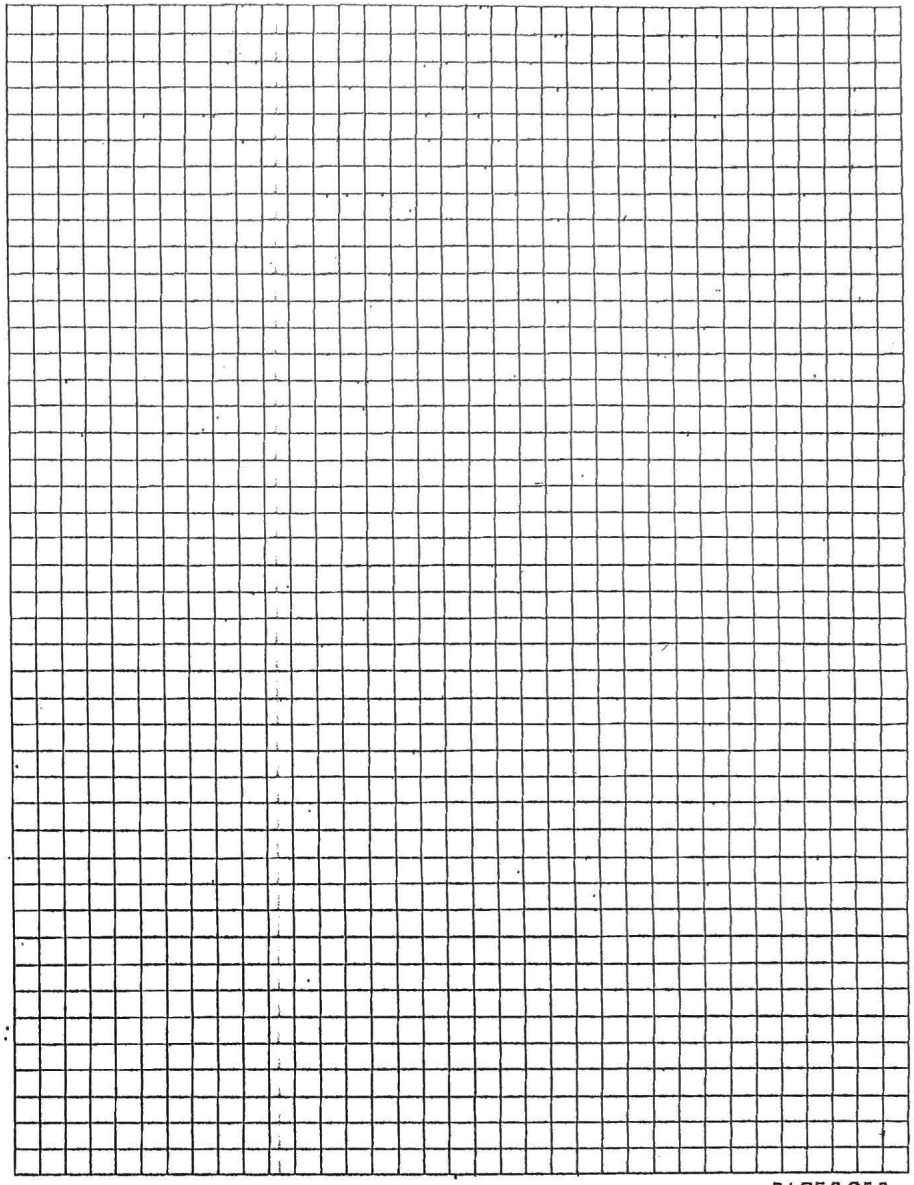
- Using a metric ruler, measure the length of your femur (thigh bone) in centimeters. This is the large bone that runs from your hip socket to your knee cap. Record this information in the table below.
- Have a partner measure your actual height in centimeters. Record this information in the table below.
- Collect the same information (femur length and height) from several of your classmates. Leave the "calculated height" row blank for now.

TABLE 1: CLASSROOM MEASUREMENTS

NAME						
FEMUR LENGTH (CM)						
HEIGHT (CM)						
CALCULATED HEIGHT (CM)						

Use the graph paper on the next page to graph the data you've collected. Use Femur Length for the x-axis and Height for the y-axis

Use your graph to answer the following question:
What relationship is there between the length of someone's femur bone and their height?



Name:_____ Date:_____

NO BONES ABOUT IT

Anthropologists have performed hundreds of calculations like the one we just did. Their calculations showed that a person's height can be estimated using the lengths of the long bones of the body—the femur, tibia, and fibula in the leg, and the ulna, radius, and humerus of the arm.

However, the relationship between the length of these bones and a person's height is different for men and women, and for people from different races. The table below lists all the different equations forensic anthropologist use to estimate a person's height

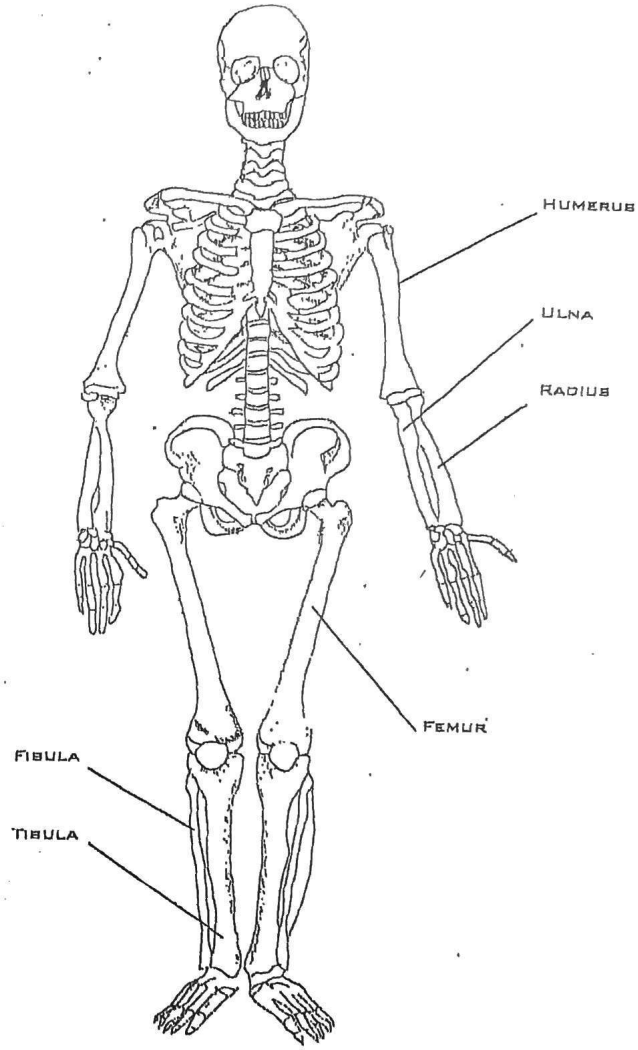
TABLE 2: FORMULAS FOR CALCULATING HEIGHT

BONE	RACE	MALE EQUATION	FEMALE EQUATION
FEMUR	CAUCASIAN	2.32 * length + 65.53 cm	2.47 * length + 54.13 cm
	AFRICAN-AMERICAN	2.10 * length + 72.22 cm	2.28 * length + 59.76 cm
	ASIAN	2.15 * length + 72.57 cm	Not Available
TIBIA	CAUCASIAN	2.42 * length + 81.93 cm	2.90 * length + 61.53 cm
	AFRICAN-AMERICAN	2.19 * length + 85.36 cm	2.45 * length + 72.56 cm
	ASIAN	2.39 * length + 81.45 cm	Not Available
FIBULA	CAUCASIAN	2.60 * length + 75.50 cm	2.93 * length + 59.61 cm
	AFRICAN-AMERICAN	2.34 * length + 80.07 cm	2.49 * length + 70.90 cm
	ASIAN	2.40 * length + 80.56 cm	Not Available
HUMERUS	CAUCASIAN	2.89 * length + 78.10 cm	3.36 * length + 57.97 cm
	AFRICAN-AMERICAN	2.88 * length + 75.48 cm	3.08 * length + 64.67 cm
	ASIAN	2.68 * length + 83.19 cm	Not Available
ULNA	CAUCASIAN	3.76 * length + 75.55 cm	4.27 * length + 57.76 cm
	AFRICAN-AMERICAN	3.20 * length + 82.77 cm	3.31 * length + 75.38 cm
	ASIAN	3.48 * length + 77.45 cm	Not Available
RADIUS	CAUCASIAN	3.79 * length + 79.42 cm	4.74 * length + 54.93 cm
	AFRICAN-AMERICAN	3.32 * length + 85.43 cm	3.67 * length + 71.79 cm
	ASIAN	3.54 * length + 82.00 cm	Not Available

These formulas are calculated for ADULT males and females. (from Bass, W.M. (1987) Human Osteology: A Laboratory and Field Manual (3rd ed.). Missouri Archaeological Society, Columbia.)

Use the table to fill in the "Calculated Height" row on Table 1. Are the results close to the actual heights? What are some possible sources of error?

LONG BONES OF THE HUMAN SKELETON



Name:_____ Date:_____

NO BONES ABOUT IT

The following bones were recovered from the construction site. A fellow forensic anthropologist has already classified the bones by sex and race. Using the mathematical formulas from Table 2, calculate the approximate height of each individual.

TABLE 3: ANALYSIS OF BONES FROM CONSTRUCTION SITE

BONE#	TYPE OF BONE	LENGTH(CM)	RACE	SEX	CALCULATED HEIGHT (CM)
1	HUMERUS	38.2	CAUCASIAN	MALE	
2	FEMUR	44.0	AFRICAN-AMERICAN	FEMALE	
3	ULNA	25.4	CAUCASIAN	MALE	
4	FEMUR	52.4	CAUCASIAN	MALE	
5	FEMUR	43.9	AFRICAN-AMERICAN	FEMALE	
6	TIBIA	43.7	CAUCASIAN	MALE	

Is it possible any of these bones come from the same person? Which bones?

What is the minimum number of bodies buried at this site? What is the maximum number of bodies?

Do all bones from the same body give exactly the same height? If not, why would the heights be different?

Name:_____ Date:_____

NO BONES ABOUT IT

Another forensic anthropologist on the team estimates the remains have been buried three to four years. A search of the local missing person's database shows that the following people disappeared during that time:

MISSING PERSONS DATABASE

MISSING PERSON #1

NAME: DANA GRANT HEIGHT: 5'0"
AGE: 27 HAIR COLOR: BLACK
SEX: F EYE COLOR: BROWN
RACE: AFRICAN-AMERICAN

DISTINGUISHING MARKS:
SMALL ROSE TATTOO ON LEFT ANKLE; APPENDECTOMY SCAR

MISSING PERSON #2

NAME: ROSALYN FAIRBANKS HEIGHT: 5'7"
AGE: 36 HAIR COLOR: BLACK
SEX: F EYE COLOR: GREEN
RACE: CAUCASIAN

DISTINGUISHING MARKS:
WEARS GLASSES OR CORRECTIVE LENSES

MISSING PERSON #3

NAME: DEVON BAILEY HEIGHT: 5'8"
AGE: 45 HAIR COLOR: BLACK
SEX: M EYE COLOR: BROWN
RACE: AFRICAN-AMERICAN

DISTINGUISHING MARKS:
NONE

Name:_____ Date:_____

NO BONES ABOUT IT

MISSING PERSONS DATABASE

MISSING PERSON #4

NAME: WAYNE AUGHNEY
HEIGHT: 6'2"
AGE: 36
HAIR COLOR: BLACK
SEX: M
EYE COLOR: BROWN
RACE: CAUCASIAN

DISTINGUISHING MARKS:
TATTOO OF A DRAGON ON UPPER RIGHT ARM

MISSING PERSON #5

NAME: CRYSTAL WILSON
HEIGHT: 5'3"
AGE: 47
HAIR COLOR: BLACK
SEX: F
EYE COLOR: BROWN
RACE: AFRICAN-AMERICAN

DISTINGUISHING MARKS:
LARGE BIRTHMARK ON UPPER BACK

MISSING PERSON #6

NAME: JESSIE ANDERSON
HEIGHT: 5'4"
AGE: 46
HAIR COLOR: BLACK
SEX: M
EYE COLOR: BROWN
RACE: AFRICAN-AMERICAN

DISTINGUISHING MARKS:
SURGICAL SCARS ON THE BACK AND LEGS DUE TO INJURIES IN AN AUTOMOBILE ACCIDENT

MISSING PERSON #7

NAME: HERMAN ARGAS
HEIGHT: 5'8"
AGE: 29
HAIR COLOR: BLOND
SEX: M
EYE COLOR: BROWN
RACE: CAUCASIAN

DISTINGUISHING MARKS:
SCARS ON THE FOREHEAD AND RIGHT CHEEK FROM CONSTRUCTION ACCIDENT

Name:_____ Date:_____

NO BONES ABOUT IT

Using the database, can you determine the possible identities of the people buried at the site?

Are the heights exactly what you expected them to be? Why or why not?

What are some possible sources of error in your identification?

What other forensic tests could you do to test your deductions?