Name _____ **Per.** _____ **Date** _____

Chapter 6- Lab
Forensic Anthropology

Title: Forensic Anthropology

Background: Forensic anthropology is that branch of applied physical anthropology concerned with the identification of human remains and associated skeletal trauma related to manner of death in a legal context. A forensic anthropologist is a scientist that identifies human remains using standard scientific technique developed in physical anthropology. Forensic anthropologists are needed to assist in the detection of crime.

Purpose: You are a forensic anthropologist that has been called to a crime scene to identify unknown skeletal remains. Using standard scientific techniques, you will identify the sex, race, age, and height of the unknown skeletal remains.

Materials: Vernier caliper, Protractor, Measuring tape, Metric ruler, calculator, camera, skull, humerus, pelvic bones, femur

Procedure:

Sex Determination Using the Pelvic Bones, Skull, Femur, and Humerus

Before you begin, determine which member of your forensics team will determine sex, race, age, and height. **Honors**- Also, you will be taking **pictures** of all of your measurements and observations to create a final presentation.

Procedures will be provided in class. If you would like a hard copy of the procedures, you may print one out from the class website.

Conclusion Questions (Regular)

Final Determinations of the Skeleton

1. Sex- _____
2. Race- _____
3. Minimum Approximate Age- _____
4. Height (feet/inches)- _____

SEX DETERMINATION

Pelvis **Table 1**

Trait	Result	Female	Male
Sub-Pubic Angle		>90°	<90°
Pubis Body Width		~40 mm	25-30 mm
Greater Sciatic Notch		>68°	<68°
Pelvic Cavity Shape		Circular and wide, showing mainly coccyx	Heart-shaped, showing sacrum and coccyx

Skull **Table 2**

Trait	Result	Female	Male
Upper Edge of Eye Orbit		Sharp	Blunt
Shape of Eye Orbit		Round	Square
Zygomatic Process		Not expressed beyond external auditory meatus	Expressed beyond external auditory meatus
Nuchal Crest (Occipital Bone)		Smooth	Rough and bumpy
External Occipital Protuberance		Generally absent	Generally present
Frontal Bone		Round, globular	Low, slanting
Mandible Shape		Rounded, V-shaped	Square, U-shaped
Ramus of mandible		Slanting	Straight

Femur **Table 3**

Trait	Result	Female	Indeterminate Sex	Male
Vertical (Maximum) Diameter of Femoral Head (mm)		<43.5	43.5-44.5	>44.5
Bicondylar Width (mm)		<74	74-76	>76
Maximum Length (mm)		<405	405-430	>430

Humerus **Table 4**

Trait	Result	Average Female	Average Male
Transverse Diameter of Humeral Head (mm)		37.0-39.0	42.7-44.7
Vertical Diameter of Humeral Head (mm)		42.7	48.8
Maximum Length (mm)		305.9	339.0
Epicondylar Width (mm)		56.8	63.9

Final sex determination _____

RACE DETERMINATION

Skull

Nasal width_____**mm**

Nasal height _____**mm**

Table 5

Trait	Result	Caucasoid	Mongoloid	Negroid
Nasal Index		<.48	.48-.53	>.53
Nasal Spine		Prominent spine	Somewhat prominent spine	Very small spine
Nasal Silling/Guttering		Sharp ridge (silling)	Rounded ridge	No ridge (guttering)
Prognathism		Straight	Variable	Prognathic
Shape of Orbital Openings		Rounded, somewhat square	Rounded, somewhat circular	Rectangular or squared

Caucasoid skull:
Nasal width ____mm ÷ Nasal height _____mm = Nasal index_____

Mongoloid skull:
Nasal width ____mm ÷ Nasal height _____mm = Nasal index_____

Negroid skull:
Nasal width _____mm ÷ Nasal height ____mm = Nasal index_____

Are the nasal indexes of each racial group close to the ones that appear in Table 5? If not, what could account for this inconsistency?

Femur

Caucasoid – fingers can fit under curvature of femur

Negroid – fingers cannot fit under curvature of femur

Final race determination _____

HEIGHT DETERMINATION

Femur

Maximum Length of Femur (MLF) _____mm = _____cm

Table 6

	Male				Female			
	Regression formula	**Height (cm)**	**Confidence interval**	**Height range (cm)**	**Regression formula**	**Height (cm)**	**Confidence interval**	**Height range (cm)**
Caucasoid	2.32 (MLF) + 65.53		±3.94		2.47 (MLF) + 54.10		±3.72	
Mongoloid	2.15 (MLF) + 72.57		±3.80		2.38 (MLF) + 56.93 **		± 3.57	
Negroid	2.10 (MLF) + 72.22		±3.91		2.28 (MLF) + 59.76		±3.41	

** Practitioners' formula extrapolated from Caucasoid and Negroid regression formulae for females.

Humerus

Maximum Length of Humerus (MLH) _____mm = _____cm

Table 7

	Male				Female			
	Regression formula	**Height (cm)**	**Confidence interval**	**Height range (cm)**	**Regression formula**	**Height (cm)**	**Confidence interval**	**Height range (cm)**
Caucasoid	2.89 (MLH) + 78.10		±4.57		3.36 (MLH) + 57.97		±4.45	
Mongoloid	2.68 (MLH) + 83.19		±4.16		3.22 (MLH) + 61.32 **		± 4.35	
Negroid	2.88 (MLH) + 75.48		±4.23		3.08 (MLH) + 64.67		±4.25	

Minimum value = _____cm ÷ 2.54 = _____ inches = ____ feet _____inches

Maximum value = _____cm ÷ 2.54 = _____inches = ____ feet _____inches

****To convert your answers to feet and inches:** assign the "feet" value according to the chart that follows, then subtract the appropriate whole number (in inches) from your answer to calculate the "inches" portion of the number (e.g., 63.78 in. is >60 in. therefore, the person is at least 5 ft. tall; 63.78 - 60 = 3.78 in. to give a final answer of 5'3.78" tall.

≥ 24 in. = 2 ft.
≥ 36 in. = 3 ft.
≥ 48 in. = 4 ft.
≥ 60 in. = 5 ft.
≥ 72 in. = 6 ft.

AGE DETERMINATION

Pelvis

Table 8

Developmental Occurrence	Approximate Age
The pubis bone and ischium are almost completely united by bone (Figure 6)	7-8
The ilium, ischium, and pubis bones are joined together (Figure 6)	13-14
The two lowest segments of the sacral vertebrae become joined together (Figure 8)	18
The ilium, ischium, and pubis bones become fully ossified with no evidence of epiphyseal unions (indicated by cartilaginous lines)	20-25
All segments of the sacrum are united with no evidence of epiphyseal unions	25-30

Femur

Table 9

Developmental Occurrence	Approximate Age
The greater trochanter first appears	4
The lesser trochanter first appears	13-14
The head, greater trochanter, and lesser trochanter first join the shaft	18
The condyles first join the shaft	20

Humerus

Table 10

Developmental Occurrence	Approximate Age
The head and tuberosities join to become a single large epiphysis	6
The radial head, trochlea, and external condyle blend and unite with the shaft	16-17
The internal condyle unites with the shaft	18
The upper epiphysis unites with the shaft	20

Final minimum age determination (range) _____years