

**SKELETON**

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**Project 1.2.3: Student Data Sheet**

**SEX DETERMINATION**

The most valuable bones in sex determination are the pelvis and the skull, although the femur, tibia and the humerus provide unique measurements that often assist in determining identity. Once you have determined your result for each trait, circle or highlight male or female.

**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 |

**Tibia Table 4**

|  |  |  |  |
| --- | --- | --- | --- |
| **Measurement** | **Result** | **Average Female** | **Average Male** |
| Maximum Epiphyseal Breadth of Proximal Tibia (mm) |  | 70.26 | 79.40 |
| Maximum Epiphyseal Breadth of Distal Tibia (cm) |  | 46.31 | 52.48 |

**Humerus Table 5**

|  |  |  |  |
| --- | --- | --- | --- |
| **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 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**List reasoning below:**

**RACE DETERMINATION**

Forensic anthropologists generally use a three-race model to characterize skeletal remains: White (European), Asian and Black (African). The skull is often the most valuable bone in tracing origins, and various measurements around the face reveal information about ancestry and heritage.

**Skull**

Nasal width: \_\_\_\_\_\_\_ mm

Nasal height: \_\_\_\_\_\_\_ mm

**Table 6**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Trait** | **Result** | **White** | **Asian** | **Black** |
| 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 the Orbital Openings |  | Rounded, somewhat square | Rounded, somewhat circular | Rectangular |

Use the three skull photographs found at station #5 to calculate the nasal index for each racial group. Compare these values to those listed above and if needed, describe what could account for any inconsistencies.

**White skull**:

Nasal width \_\_\_\_\_\_ mm ÷ Nasal height \_\_\_\_\_\_ mm = Nasal index \_\_\_\_\_\_\_

**Asian skull**:

Nasal width \_\_\_\_\_\_ mm ÷ Nasal height \_\_\_\_\_\_ mm = Nasal index \_\_\_\_\_\_\_

**Black skull**:

Nasal width \_\_\_\_\_\_ mm ÷ Nasal height \_\_\_\_\_\_ mm = Nasal index \_\_\_\_\_\_\_

**Femur**

White- fingers can fit under the curvature of the femur

Black- fingers cannot fit under the curvature of the femur

**FINAL RACE DETERMINATION** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**HEIGHT DETERMINATION**

The height of the individual is most often determined by examining the lone bones, such as the femur, tibia, or humerus. The accuracy of these calculations is improved if two or more bones are used. Forensic anthropologists have compared bone length to height and have calculated formulas that describe this relationship (broken down by racial group and by gender). Using information you have gathered about the gender and ethnicity of the skeleton, choose the appropriate equations and calculate a possible height range. As there is no listed formula for using the maximum length of the femur to estimate height in an Asian female, use only the equation listed for the other available bone.

**Femur**

Maximum Length of the Femur (MLF) \_\_\_\_\_\_\_ mm = \_\_\_\_\_\_\_ cm

**Table 7**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Male** | | **Female** | |
| **Regression Formula** | **Height Range (cm)** | **Regression Formula** | **Height Range (cm)** |
| **Caucasoid (White)** | 2.32 (MLF) + 65.53 ± 3.94 |  | 2.47 (MLF) + 54.10 ± 3.72 |  |
| **Mongoloid (Asian)** | 2.15 (MLF) + 72.57 ± 3.80 |  | Formula not available |  |
| **Negroid (Black)** | 2.10 (MLF) + 72.22 ± 3.91 |  | 2.28 (MLF) + 59.76 ± 3.41 |  |

**Tibia**

Maximum Length of Tibia (MLT) \_\_\_\_\_\_\_ mm = \_\_\_\_\_\_\_\_\_ cm

**Table 8**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Male** | | **Female** | |
| **Regression Formula** | **Height Range (cm)** | **Regression Formula** | **Height Range (cm)** |
| **Caucasoid (White)** | 2.42 (MLT) + 81.93 ± 4.00 |  | 2.90 (MLT) + 61.53 ± 3.66 |  |
| **Mongoloid (Asian)** | 2.39 (MLT) + 81.45 ± 3.27 |  | 2.68 (MLT) + 67.05 ± 3.68 |  |
| **Negroid (Black)** | 2.19 (MLT) + 85.36 ± 3.91 |  | 2.45 (MLT) + 72.56 ± 3.70 |  |

**Humerus**

Maximum Length of the Humerus (MLH) \_\_\_\_\_\_\_ mm = \_\_\_\_\_\_\_ cm

**Table 9**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Male** | | **Female** | |
| **Regression Formula** | **Height Range (cm)** | **Regression Formula** | **Height Range (cm)** |
| **Caucasoid (White)** | 2.89 (MLH) + 78.10 ± 4.57 |  | 3.36 (MLH) + 57.97 ± 4.45 |  |
| **Mongoloid (Asian)** | 2.68 (MLH) + 83.19 ± 4.16 |  | 3.22 (MLH) + 51.32 ± 4.35 |  |
| **Negroid (Black)** | 2.88 (MLH) + 75.48 ± 4.23 |  | 3.08 (MLH) + 64.67 ± 4.25 |  |

To determine the probable height range of the individual, refer to the height tables you filled in above and record the minimum and maximum value of the calculated height ranges in the space below. Convert each value to feet and inches and show the final height range.

**FINAL HEIGHT DETERMINATION**

Minimum value = \_\_\_\_\_\_\_\_\_\_ cm ÷ 2.54 = \_\_\_\_\_\_\_ inches = \_\_\_\_ feet \_\_\_\_\_ inches

Maximum value = \_\_\_\_\_\_\_\_\_\_ cm ÷ 2.54 = \_\_\_\_\_\_\_ inches = \_\_\_\_ feet \_\_\_\_\_ inches