**TRAINING LAB – SKELETAL REMAINS: IDENTIFYING BONES**

**NAME___________________________________________**

**Background:** Skeletal remains are important pieces of evidence. The flesh, muscle, and organs of a victim rapidly decompose; however, the victim’s skeleton may remain intact for years – waiting to help tell the story of the victim. The identification and examination of skeletal remains is completed by a specialist called a **FORENSIC ANTHROPOLOGIST**. A Forensic Pathologist can often determine a victim’s sex, race, approximate age and height by carefully analyzing the victim’s skeletal remains. To analyze skeletal remains properly you first need to be able to identify the skeleton’s individual bones. In this Training Lab you will learn how to recognize and identify many of the human body’s 206 bones.

1. You will be trained to identify many of the major bones found in the human body.
2. You will be trained to determine if an individual bone came from the right or left side of the human body.

**Procedures:**
1. The human body is composed of 206 separate bones – and each bone has a name. There are: 28 skull bones, 26 vertebral bones, 25 rib bones and sternum, 10 bones for the shoulders and arms, 54 bones for the hands, 10 bones for the pelvis and legs, 52 bones for the feet, and 1 hyoid bone just under your skull.
2. You should be familiar with the following Anatomical Direction terms. These terms are commonly used to describe regions of the human body (a direction on a bone, the location of an injury on a body, etc.). You will use these terms in this Training Lab to help you identify a LEFT human bone from a RIGHT human bone.

**ANATOMICAL POSITION** – the Anatomical Position is a human standing, arms hanging by the sides, with the PALMS FACING FORWARD. Directions on the body are always given in relation to the Anatomical Position.

- **SUPERIOR** – upward, toward the head
- **INFERIOR** – downward, toward the feet
- **DORSAL** – toward the back (back of head, back of legs, back of arm, all of your back)
- **VENTRAL** – toward the front (face, front of legs, front of arms, palm of hand, chest and abdomen)
- **MEDIAL** – closer to the middle of your body, or closer to your body
- **LATERAL** – away from the middle of your body, away from your body, toward the sides
3. The human skeleton is divided into two major regions:

**AXIAL SKELETON** – the skull, vertebra, sternum, and ribs

**APPENDICULAR SKELETON** – the shoulders, arms, hands, pelvis, legs, and feet

4. As a Forensic Anthropologist in training, you are responsible for learning to identify the list of bones that follows. Carefully read the bone descriptions below while observing the individual bones of a disarticulated skeleton. Sketches have also been supplied to help you identify individual bones AND identify if a bone came from the left or right side of a body. Your supervisor may also supply additional materials to help you learn the bones.

**#1 – SKULL** – the skull is easy to identify. It is composed of 28 bones that have fused together. The **SUTURE** lines you see on the skull is where separate bones have grown together.

**#2 – MANDIBLE** (the jaw)

**#3 – CERVICAL VERTEBRA** – there are **SEVEN** Cervical Vertebra located in your neck. They can easily be identified by their Transverse Foramen (holes for nerves).
#4 – **THORACIC VERTEBRA** – there are TWELVE Thoracic Vertebra in your upper back. The ribs attach to these vertebra. They can usually be identified by their shape – they look like a giraffe’s head.

Thoracic Vertebra

You can feel these projections (Spinous Processes) along the dorsal surface of your upper back

The smooth surface of these “ears” (Superior Articulating Facets) face FORWARD

Each Thoracic Vertebra looks like a giraffe when held like this!

#5 – **LUMBAR VERTEBRA** – there are FIVE Lumbar Vertebra in you lower back. These are the most massive vertebra and they can usually be identified by their shape – they look like a moose’s head.

Lumbar Vertebra

You can feel these projections (Spinous Processes) along the dorsal surface of your lower back

The smooth surface of these “ears” (Superior Articulating Facets) face INWARD (medially) toward each other

Each Lumbar Vertebra looks like a moose when held like this!

#6 – **RIBS** – there are TWELVE PAIRS of ribs of various sizes (24 total ribs) attached to the Thoracic Vertebra.

1st Rib → 6th Rib →
#7 – **SACRUM** – this is made of several vertebra that have fused together as one larger bone for strength. It makes up the Dorsal surface of the pelvis.

#8 – **COCCYX** – your “tailbone”.

#9 – **COXAL BONE** (or **INNOMINATE BONE**) – your “pelvic bone”. The entire pelvis is composed of TWO Coxal (Innominate) Bones and ONE Sacrum. The two Coxal Bones can be separated from each other. **YOU SHOULD BE ABLE TO IDENTIFY IF IT IS A LEFT OR RIGHT COXAL BONE.**

Follow the steps below to learn how to identify a left or right coxal bone.

**Coxal Bone**

**Sacrum**

**Coxal Bone**

You can feel this part of your Coxal Bone on the sides of your hips

**Step #1** – Hold the Coxal bone next to your hip and orient the “fan-shaped” part of the bone so it is Superior

**Step #2** – Orient the socket so it is pointing Lateral

**Step #3** – The Pointy edge here should be toward your Ventral surface

**Step #3** – the Rounded, rough edge here should be toward your Dorsal surface

**THIS IS A RIGHT COXAL BONE**
#10 – **FEMUR** – your upper leg bone. YOU SHOULD BE ABLE TO IDENTIFY IF IT IS A LEFT OR RIGHT FEMUR. Follow the steps (to the right) to learn how to identify a left or right femur.

#11 – **PATELLA** – your “kneecap”

#12 – **TIBIA** – your “shin bone” found in your lower leg. YOU SHOULD BE ABLE TO IDENTIFY IF IT IS A LEFT OR RIGHT TIBIA. Follow the steps below to learn how to identify a left or right Tibia.

#13 – **FIBULA** – this long, thin bone runs beside your tibia on the lateral edge of your lower leg. You DO NOT need to know Left or Right Fibula.

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### Femur

**Step #1** – Hold this end next to your hip and orient the ball (Head) so it is pointing Medial.

**Step #2** – This side of the femur is the Ventral surface of your knee.

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### Tibia

**Step #1** – Hold this end next to your knee. The big bump that sticks out (the Tibial Tuberosity) should be on the Ventral surface. You can feel this bump just inferior of your knee.

**Step #2** – The side of the Tibia that hangs down here (Medial Maleolus) goes on the Medial surface of your ankle. You can easily feel this big round bump on the inside of your ankle.

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### Patella

You can easily feel your Patella (your kneecap)

Feel that big, round bump on the lateral side of your ankle? You are feeling this!

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### Fibula

You can easily feel the sides of your femur on either side of your knee.
#14 – **CLAVICLE** – your “collar bone”. This bone has a slight “S” shape. You DO NOT need to know left or right Clavicle.

![Clavicle Diagram]

#15 – **SCAPULA** – your “shoulder blade”. YOU SHOULD BE ABLE TO IDENTIFY IF IT IS A LEFT OR RIGHT SCAPULA. Follow the steps below to learn how to identify a left or right Scapula.

**Scapula**

Step #1 – Place the smooth, flattened side of the Scapula against your back in your shoulder area.

Step #2 – The small, shallow, socket located at this end points lateral (toward your shoulder). The Humerus attaches to this socket.

Step #1 – This raised area (Spine) points away from your back. You can feel this Spine in your upper back/shoulder area.

Step #3 – The longest part of the “blade” points inferior

**THIS IS A RIGHT SCAPULA**
#16 – **HUMERUS** – your upper arm bone. YOU SHOULD BE ABLE TO IDENTIFY IF IT IS A LEFT OR RIGHT HUMERUS. Follow the steps (to the right) to learn how to identify a left and right Humerus.

#17 – **ULNA** – the Ulna runs from your elbow to the little finger side of your wrist (it is Medial in the Anatomical Position). The Ulna has a very distinctive “U-Shaped” notch. YOU SHOULD BE ABLE TO IDENTIFY IF IT IS A LEFT OR RIGHT ULNA. Follow the steps below to learn how to identify a left and right Ulna.

#18 – **RADIUS** – the Radius runs from your elbow to the thumb side of your wrist (it is Lateral in the Anatomical Position). The Radius has a very distinctive circular end (found on its Superior end). You DO NOT need to know left and right Radius.

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**Humerus**

Step #1 – Hold this end to your shoulder and orient the ball (Head) so it is pointing Medial.

**THIS IS A RIGHT HUMERUS**

Step #2 - This larger, deeper depression goes toward the dorsal surface of your elbow.

**Ulna**

Step #1 – Place this end at your elbow. The back of the ulna here IS your elbow.

You can easily feel this as a bump on the little finger side of your wrist.

**THIS IS A RIGHT ULNA**

Step #2 – The “U-Shaped” notch faces toward the Ventral surface. The Humerus attaches here.

Step #3 – On one side of the “U-Shaped” notch find a shallow, curved, depression. This depression faces Lateral.
#19 – **Carpals** – the EIGHT small bones in each hand that make up the “wrist”.

#20 – **Metacarpals** – the FIVE longer bones in each hand that make up your palm.

#21 – **Phalanges** – the FOURTEEN bones that make up your fingers in each hand (three for each finger and two for each thumb).

#22 – **Tarsals** – the SEVEN smaller bones in each foot that make up the “ankle”.

- **Calcaneus** – the large tarsal that makes up your heel
- **Talus** – the large tarsal that connects with your Tibia

#23 – **Metatarsals** – the FIVE longer bones in each foot.

#24 – **Phalanges** – the FOURTEEN bones that make up your toes.

#25 – **Sternum** – the bone in the middle of your chest. The ribs attach to this bone.

#26 – **Hyoid** – this SINGLE, small, curved bone is found beneath your skull. It helps support your larynx (“voicebox”, “adam's apple”).

4. Answer the Training Lab Questions when you feel confident you can properly identify skeletal remains that you encounter at a crime scene.
QUESTIONS – SKELETAL REMAINS: IDENTIFYING BONES

NAME______________________________

1. Neatly label the skeleton diagram with the following bones: Skull, Mandible, Ribs, Cervicle Vertebra, Thoracic Vertebra, Lumbar Vertebra, Coxal Bone, Sacrum, Coccyx, Clavicle, Sternum, Scapula, Humerus, Radius, Ulna, Femur, Tibia, Fibula, Patella, Carpals, Metacarpals, Phalanges, Tarsals, Metatarsals.
2. Which bone is the easiest for you to tell left from right? ______________________________

3. Which bone is the most difficult for you to tell left from right? __________________________

4. Observe the skeletal remains that were discovered in a shallow grave by a hunter (your Supervisor will let you know where these bones can be found). As our crime lab’s Forensic Anthropologist we need for you to complete an inventory of the bones that were discovered. Complete the following Bone Inventory Table – you DO NOT need to mark Left or Right for any Radius, Fibula, or Clavicle bones you find.

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