Terms to Know for Unit 6

**Pelvis**
- Coxal bones, Sacrum & Coccyx
- Sacroiliac joint
- Pubic symphysis

**Pelvic Girdle**
- Left and right coxal bones

**Coxal bones**
- Ilium
  - Iliac crest
  - Anterior superior iliac spine
  - Posterior superior iliac spine
  - Anterior inferior iliac spine
  - Posterior inferior iliac spine
- Ischium
  - Ischial tuberosity
- Pubis
- Obturator foramen
- Acetabulum

**Femur**
- Head
- Neck
- Greater trochanter
- Lesser trochanter
- Gluteal tuberosity
- Linea aspera
- Lateral condyle
- Medial condyle
- Intercondylar notch

**Patella**

**Metatarsal Bones**

**Phalanges**
- Proximal, Middle, and Distal

**Tarsal Bones**
- Calcaneus
- Talus

**Articulations**
- Synovial joints
- Articular capsule
- Synovial membrane
- Synovial fluid
- Joint cavity
- Articular cartilage
- Ligaments
- Bursae

**Types of Synovial Joints**
- Plane joints
- Hinge joints
- Pivot joints
- Condyloid joints
- Saddle joints
- Ball and Socket joints

**Muscle Attachments**
- Origin
- Insertion

**Knee Joint**
- Quadriceps femoris tendon
- Patella
- Patellar ligament

**Types of Movements**
- Flexion
- Extension
- Hyperextension
- Abduction
- Adduction
- Rotation
- Circumduction
- Pronation
- Supination
- Inversion
- Eversion
- Dorsiflexion
- Plantar flexion
- Protraction
- Retraction
- Elevation
- Depression
Learning Objectives (modified from HAPS learning outcomes)

1. Organization of the skeletal system.
   a. Define the two major divisions of the skeletal system (axial and appendicular) and list the general bone structures contained within each.

2. Gross anatomy of bones
   a. Identify the individual bones and their location within the body.
   b. Identify bone markings (spines, processes, foramina, etc.) and describe their function (e.g., point of articulation, muscle tendon attachment, ligament attachment, passageway for nerves and vessels).
   c. Identify the structural components of the synovial joint, including accessory structures like bursae, tendon sheaths, and ligaments.
      i. Identify the different structures of the knee.
   d. Describe and demonstrate the generalized movements of synovial joints.
   e. For each of the six structural types of synovial joints:
      i. Describe the anatomical features of that structural type.
      ii. Describe locations in the body where each structural type can be found.
      iii. Predict the kinds of movements that each structural type will allow.

Explanation of Anatomy

By now you probably have your own protocol for learning all the bones and their structures. In this unit, we will finish learning the bones of the human skeleton. The skeleton helps support soft tissues, and it plays a crucial role in body movement. Our bodies have several types of joints that allow for various types of movement. For example, you cannot twist your finger around, but you can draw an imaginary circle in the air with it. In this lab, we will first learn the lower limb bones and their structures. Then, we will explore the structures of moveable joints, the different types of moveable joints, and the types of movements those moveable joints allow. We will finish with learning structures of the knee joint.

Think about all the weight the bones of our lower limbs support. If you compared lower limb bones to upper limb bones, you would easily see that the lower limb bones are bigger. The largest, strongest, and longest bone in the human body is the femur. A person’s height is approximately four times the length of their femur. Think about how the lower limbs are moving as we sit, stand, walk, and run. Joints are the weakest parts of the skeleton, but they allow for our skeleton to move. The combined strength of our bones and the weak points that are our joints make it so that we can jump but land on the ground without our skeleton shattering.
Pelvis

The pelvis is composed of bones from the axial and appendicular skeleton: the right and left coxal bones, the sacrum, and the coccyx. The coxal bones articulate with the sacrum at the sacroiliac joint. Also, the two coxal bones articulate with one another at the midline of the body at the joint called the pubic symphysis. The male pelvis and the female pelvis are easily distinguishable (see Image 1). The arch that is formed from the articulation at the pubic symphysis is shallower in a female pelvis and narrower in a male pelvis. Also, the pelvic body cavity of the female pelvis is larger for childbearing capabilities compared to a male pelvis. The pubic symphysis consists of fibrocartilage, which resists compression forces during childbirth.

![Image 1: Comparison of female and male pelvises](Creative Commons Attribution 4.0 International)

Pelvic Girdle

The bones of the pelvic girdle are part of the appendicular skeleton. Recall from Unit 5 that the bones of the girdles are the most proximal bones of the appendicular skeleton. In the case of the lower limbs, the two coxal bones on either side make up the pelvic girdle.

Coxal Bones

Each coxal bone is made up of three fused bones: the ilium, ischium, and pubis (see Image 2). You should be familiar with the ilium from learning the left and right iliac regions of the nine abdominopelvic regions in Unit 1.
**Mini Activity: Revisit the abdominopelvic regions**

In the tic-tac-toe grid below, write in the nine abdominopelvic regions.

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   |   |   
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   |   |   
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Perhaps, in your lab, instead you learned the quadrants. In that case, sketch out the quadrants and identify those instead.

The **ilium** is a broad flat bone that forms the superior region of the coxal bones and has a crest at its proximal, superior border called the **iliac crest**. As you hold the coxal bone you will notice that one side has a roughened appearance. This is where the ilium articulates with the sacrum at the sacroiliac joint at the posterior side of the coxal bone. You can use this to determine the four separate iliac spines of the ilium. Find the two points on the posterior roughened side of the ilium. The point above is called the **posterior superior iliac spine** and the point below is called the **posterior inferior iliac spine**. You will notice two more points on the anterior smooth side of the ilium. The point above is the **anterior superior iliac spine**, and the point below is the **anterior inferior iliac spine**. You now know the anterior and posterior sides of the coxal bone, which will help you distinguish a right coxal bone from a left coxal bone. Next, find the **acetabulum**, a depression in the coxal bone that is shaped like a cup. The name acetabulum comes from it looking like a “vinegar cup” that was used in ancient Greece. The acetabulum should face laterally because it articulates with the head of the femur. If you put the coxal bones next to your body, you can determine which bone is left and right. Place the iliac crest proximal to your body and facing upwards with the roughened side posterior and the acetabulum facing laterally.
Mini Activity: Can you identify left from right coxal bones?

If you are studying in the library or you’re in the lab, distinguish a right from a left coxal bone.

First, list the three bone structures and their orientation that you will use to figure out right from left coxal bones:

1. 
2. 
3. 

Using these bone structures, distinguish the right and left coxal bones from each other. Get confirmation from your instructor that you identified the bones correctly. The other bones that you will need to recognize as a left and right bone for this unit are the femur, tibia, and fibula.

The acetabulum is composed from all three coxal bones (ilium, ischium, and pubis). The ischium forms the posterior and inferior part of the coxal bone, and the pubis forms the anterior and inferior part of the coxal bone. The roughened rounded part of the ischium is called the ischial tuberosity, which is an attachment point for the hamstring muscles. The pubis and the ischium together form the bony wall of an opening called the obturator foramen, which allows for the passage of blood vessels and nerves into the lower limb.

![Image: Coxal bone and its bone markings]

*Image 2: Coxal bone and its bone markings*

Creative Commons Attribution 4.0 International Openstax URL: Coxal Bone and its bone markings
Femur

The thigh bone is called the **femur**. The **head** of the femur is the most proximal end that articulates with the acetabulum of the coxal bone. The head faces medially. Distal to the head is a narrowed region, the femur’s **neck**. You will notice two large, irregular bony projections near the head and neck. These are called trochanters, and the femur is the only bone that has them. The larger of the two is the **greater trochanter**, and the smaller of the two is the **lesser trochanter**. Moving distally on the posterior diaphysis of the femur you will feel a bony bump where the gluteal muscles attach to the femur. This bump is called the **gluteal tuberosity**. Recall that this is a similar pattern seen with the deltoid tuberosity of the humerus. The gluteal tuberosity of the femur can be traced distally to form a ridge that travels the length of the diaphysis of the femur. This ridge or line is called the **linea aspera**, and it is an attachment point for whole muscles that make up part of the inner thigh. At the distal end of the femur are condyles where the femur articulates with the tibia of the leg. The femur has a **lateral condyle** and a **medial condyle**. The medial condyle is on the same side as the head of the femur. Between the two condyles is a depression called the **intercondylar fossa** (see Image 3).

*Image 3: Femur and its bone markings*

[Creative Commons Attribution 4.0 International](https://creativecommons.org/licenses/by/4.0/) Openstax URL: [Femur and its bone markings](https://cnx.org/contents/4843f0cf-9f6e-4a4e-bd6d-c03a6e626f5d@5.132)
Mini Activity: What patterns are you noticing?

One thing that helps a lot of students learn all the information in an A&P lab is learning and discovering patterns. For example, the humerus and femur both have tuberosities named after the muscle that attaches to that tuberosity: the deltoid tuberosity and the gluteal tuberosity.

What patterns have you noticed? Write them below.

Tibia and Fibula

There are two lower leg bones: the tibia and fibula. The tibia, commonly called the shin bone, is the larger of the two and more medial. The medial and lateral condyles of the tibia articulate with the distal end of the femur. Between the two tibial condyles is a projection that is shaped like a crown called the intercondylar eminence. Eminence is defined as a position of superiority, and this crown-shaped projection is named based on how a person in a superior position wears a crown. On the anterior surface of the diaphysis of the tibia is the tibial tuberosity where the quadriceps femoris muscles attach through the patellar ligament to the tibia. The last tibial bone feature that you need to know is a big, bony process at the medial distal end of the tibia. This process, the medial malleolus, is shaped like a mallet.

The fibula is the most lateral of the two lower leg bones. This long slender bone is commonly broken, and at its distal end, it has a mallet-shaped projection called the lateral malleolus. The fibula’s head is on the proximal end and articulates with the tibia. Tibia and fibula bone markings are shown in Image 4.
Tarsal Bones

The pedal is composed of the proximal tarsals, metatarsals, and phalanges (toes). A mnemonic can be used to remember the seven **tarsal bones** like we did for the carpal bones in Unit 5. Starting with the biggest tarsal bone, the heel, and moving proximally and then medially to laterally, ending with a cube shaped bone, the tarsal bones include the **calcaneus**, **talus**, navicular, medial cuneiform, intermediate cuneiform, lateral cuneiform, and cuboid. Use: Chris Told Nora Milk Is Like Cream to remember these.

“Chris Told (starting at heel and moving proximal)
Nora Milk (move anterior towards toes)
Is Like Cream” (move laterally going from hallux to pinky toe)
‘Chris’ for the **calcaneus** and ‘Told’ for the **talus**.
‘Nora’ for the navicular and ‘Milk’ for the medial cuneiform.
‘Is’ for the intermediate cuneiform, ‘Like’ for the lateral cuneiform, and ‘Cream’ for the cuboid.
Metatarsal Bones and Phalanges
The anterior region of the pedal has five digits that are composed of long metatarsal bones and phalanges. Each digit has three phalanges: the proximal phalange, middle phalange, and distal phalange. The hallux (big toe) only has a proximal and distal phalange. The metatarsals and phalanges are numbered 1 to 5 starting from the hallux (1) and moving laterally in order to the last metatarsal (5) and phalange (5), the pinky toe. Image 5 shows the bones of the pedal.

Articulations
Recall that where two or more bones meet is a joint or articulation. The specific articulations that we looked at in previous units were the immovable sutures of the skull. In the appendicular skeleton, many of the articulations are freely movable joints called synovial joints (see Image 6). Synovial joints have a joint cavity located between the articulating bones. The joint cavity is enclosed in an articular capsule made of an inner synovial membrane composed of areolar connective tissue with many blood vessels. Surrounding the membrane is an outer fibrous layer (capsule) composed of dense irregular connective tissue. The synovial membrane produces synovial fluid that enters and fills the joint cavity. Synovial fluid is a lubricant that allows bones to slide over one another without producing friction. When bones of a synovial joint move, pressure can increase in the joint cavity. This pressure pushes on the articular...
cartilage that covers the ends of the bones in the articulation, causing the cartilage to weep more synovial fluid into the joint cavity. Ligaments reinforce the joint by connecting bone to bone. Ligaments are made of dense regular connective tissue that resists pulling forces during the movement of synovial joints. Bursae are pouches of synovial fluid that help to reduce friction outside of the joint cavity where bones, ligaments, and muscle rub together when we move our skeleton.

*Image 6: Synovial joint and its parts*

[Creative Commons Attribution 4.0 International Openstax URL: Synovial joint and its parts](https://openstax.org/l/330010)

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**Mini Activity: Tissue review**

Match the tissue with its function.

1. Dense irregular  
   A. Resists pulling forces
2. Dense regular  
   B. Allows for nutrients to diffuse to other tissues and areas in the body
3. Areolar  
   C. Resists forces from multiple directions

**Types of Synovial Joints**

There are six types of synovial joints (see Image 7). As the bones are displaced in synovial joints, they are moving through a plane and are rotating around axes. The first type of synovial joint is a plane joint where bones glide over one another through a plane and do not rotate around an axis. The carpal bones
in the manus glide over one another through the frontal plane when you wave your hand to say hello. The other remaining types of synovial joints have movement that involve rotating around one or more axes.

A **hinge joint** is like the hinge in a door where the movement involves rotation around one axis, or uniaxial movement. The elbow and knee are good examples of a hinge joint. The movement of the antebrachium and the lower leg is through the sagittal plane where the radius and ulna of the forearm and the tibia of the lower leg rotate around a left to right horizontal axis that is perpendicular to the sagittal plane.

**Pivot joints** also are uniaxial, rotating around one axis. In pivot joints, a bone moves through the transverse plane as it pivots around an axis perpendicular to that plane that runs the length of our bodies. An example of a pivot joint is the articulation between the atlas and axis vertebrae. The atlas rotates and pivots around the dens of the axis through the transverse plane when you nod your head “no” to a question.

**Condyloid joints** are biaxial, rotating around two axes. You previously learned about one condyloid joint in the body that occurs between the atlas and occipital bone. The movement at this articulation is happening through the sagittal plane just like a hinge joint, but condyloid joints also have movement through the frontal plane around an anterior to posterior horizontal axis that is perpendicular to the frontal plane. When you nod your head “yes,” the movement is through the sagittal plane, and when you move your ear towards your shoulder, the movement is through the frontal plane.

The **saddle joint** is a special joint of your thumb (pollex) that is biaxial. This joint allows for movement within the frontal plane, but it also allows the thumbs to be opposable. The saddle joint of the pollex helps us to better grasp objects because it wraps around an object on the opposite side of where our digits are holding the object.

The last synovial joint is the **ball and socket joint**, which is a joint that allows movement around multiple axes. The shoulder and hip are examples of ball and socket joints. In the shoulder joint, the head of the humerus articulates with the cavity of the scapula that is part of the pectoral girdle, and in the hip joint, the head of the femur articulates with the depression of the acetabulum that is part of the pelvic girdle. In these joints, the head (ball) rotates within the cavity or depression (socket), allowing for movement through all three planes: sagittal, transverse, and frontal.

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**Mini Activity: Where do you find the different types of synovial joints?**

Write next to each synovial joint type at least one place in the body that represents that type.

1. Plane
2. Hinge
3. Pivot
4. Condyloid
5. Saddle
6. Ball and Socket
Image 7: Six types of synovial joints

Creative Commons Attribution 4.0 International Openstax URL: Six types of synovial joints
Muscle Attachments
Muscles move the skeleton and cause the displacement of the bones related to synovial joints. In general, muscles have two attachments to the skeleton. One attachment is called the muscle’s origin. This is the bone in a synovial joint that does not move. The other attachment of a muscle is called its insertion. When a muscle contracts or shortens, it pulls on the bone that is its insertion, causing that bone to move. Many origins and insertions of muscles follow one of two general patterns. The first is where the insertion is more lateral compared to the origin. The muscles of the torso that attach to the appendicular skeleton and the axial skeleton follow this pattern. When these muscles contract, the limbs move, but the axial skeleton does not. Another common pattern is where muscles that only attach to the appendicular skeleton have their insertion distal to the muscle and their origin proximal to the muscle. For example, the anterior brachial muscle, the biceps brachii, attaches to the radial tuberosity that is distal to it and attaches to the coracoid process of the scapula that is proximal to it. When the biceps brachii contracts, this muscle’s insertion on the radius moves towards the biceps brachii’s origin on the scapula, which does not move. When you start to learn the names of whole muscles in the following units, you will get more practice learning the insertions and origins of muscles.

Types of Movement
Now that you know the six types of synovial joints and how muscles move our skeleton, we are going to learn the different types of movement that our muscles perform as they displace bones in our skeleton.

Movements that occur within the sagittal plane are flexion, extension, and hyperextension. Flexion is when the body moves out of anatomical position. Imagine a line travelling the length of your body. The angle of this line is 180 degrees. During flexion, when the body moves out of anatomical position, the angle decreases, or becomes acute. Extension is when the body moves back into anatomical position. Now imagine after you have flexed that you put your body back to anatomical position, thus increasing the angle by bringing it back to 180 degrees. If you keep moving past 180 degrees, making the angle obtuse, this is the movement of hyperextension. The movement of hyperextension is not as comfortable to perform as flexion. Hinge joints allow for flexion and extension. Condyloid and ball and socket joints allow for flexion, extension, and hyperextension.

Movements that occur in the frontal plane are abduction and adduction. Abduction is when the body moves out of anatomical position. If you move your arms away from your body within the frontal plane, think of them being abducted by aliens. You are performing the movement of abduction. The opposite movement is adduction, when you put the body back into anatomical position. When you adduct your arms, you are adding them back to the body. Condyloid and ball and socket joints allow for abduction and adduction.

Movements that occur in the transverse plane are rotation, pronation, and supination. Rotation is when a bone rotates around another bone. This occurs as the atlas rotates around the axis when you nod your head “no.” The radius also rotates around the ulna within the transverse plane. The rotation of the radius has specific names. When the radius rotates around the ulna causing the palms to face posteriorly out of anatomical position, this movement is pronation. When the radius rotates around the ulna, moving the body back into anatomical position where the palms are facing anteriorly, this movement is supination. Pivot joints and ball and socket joints allow for rotation.
**Circumduction** is a movement that is described as drawing the circumference of a circle. You can do this at the shoulder joint as you move your upper limb to trace a circular pattern in the air with your digits. Also, you can do this with one of your digits as you say “woo-hoo.” Notice that the ball and socket joint performing this movement is much smoother compared to the condyloid joint between your proximal phalange and metacarpal. This is because a ball and socket is a multiaxial synovial joint. The “woo-hoo” movement of the condyloid joint is not as smooth because condyloid joints are biaxial.

The mandible and temporal bones form a modified hinge joint that allows for movement in the transverse and sagittal planes. As you move your mandible forward within the transverse plane, you are performing the movement **protraction**. As you move your mandible back within the transverse plane, you are performing the movement **retraction**. When you chew and talk, your mandible is moving up, which is **elevation**, and down, which is **depression**, within the sagittal plane.

The pedal also has specific movements that it performs. When you point your toes inward, this is called **inversion**. When you point your toes outward, this is called **eversion**. As you walk, you lift your toes towards the sky as you perform **dorsiflexion**. When you point your toes downward to plant your foot back onto the ground, this is called **plantar flexion**. The movements of synovial joints are shown in Image 8 and Image 9.

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**Mini Activity: List movements and their examples**

List all the movements you need to know for lab and provide next to each movement a synovial joint that allows for that movement. One has already been provided as reference starting point.

1. Circumduction at the shoulder’s ball and socket joint.
2. ?
3. ?
4. ?
5. ?
6. ?
7. ?
8. ?
9. ?
10. ?
11. ?
12. ?
13. ?
14. ?
15. ?
16. ?
17. ?
Image 8: Skeleton movements Part 1

Modified Creative Commons Attribution 4.0 International Openstax URL: Skeleton movements Part 1
Knee Joint

The knee joint where the tibia articulates with the femur is a hinge joint. Unlike the elbow joint, which is very stable because the ulnar bone wraps around the trochlea of the humerus, the knee joint is more prone to dislocating. There are several ligaments that help the knee joint stay in place (see Image 11). Two ligaments that are off to the side of this joint are called collateral ligaments. The ligament that connects the tibia to the femur on the medial side is called the tibial collateral ligament or the medial collateral ligament (MCL). The ligament that connects the fibula to the femur on the lateral side is called the fibular collateral ligament or the lateral collateral ligament. These two ligaments prevent the bones of the knee from sliding left to right. When athletes are hit from the side, the MCL is one of the most common ligaments that is injured.
The knee joint also is kept stable by two other ligaments. These two ligaments cross over each other so they are called the cruciate ligaments. The ligament that is in front is called the anterior cruciate ligament (ACL), and the ligament that is behind is called the posterior cruciate ligament. The ACL is another ligament that often becomes injured when athletes are hit along the side of the knee. The ACL and the posterior cruciate ligaments prevent inappropriate forward and backward movement of the knee.

The anterior thigh muscle, the quadriceps femoris, attaches to the tibia through the knee. The quadriceps femoris tendon attaches the anterior thigh muscle to the patella, and the patellar ligament attaches the patella to the tibia at the tibial tuberosity. As the quadriceps femoris contracts, the quadriceps femoris tendon and the patellar ligament pull on the tibia, causing the tibia to move back into anatomical position during the movement of extension. A bursa above the patella, called the suprapatellar bursa, helps reduce friction as the tendon rubs against the femur when we are walking.

The last two structures you need to learn for the knee are the menisci. Both menisci sit on top of the tibial bone. The one that is more medial is called the tibial or medial meniscus and the one that is more lateral is called the fibular or lateral meniscus. The menisci, which are made of fibrocartilage, resist compression forces as the shins support the weight of our bodies. See Image 11 to review the structures of the knee.
Image 11: Knee Joint

Creative Commons Attribution 4.0 International | Openstax URL: Knee Joint
# Activity 1: Label Bones and Bone Markings

<table>
<thead>
<tr>
<th>Found It</th>
<th>Model Name</th>
<th>Term</th>
<th>If bone marking, what is its function?</th>
<th>Does bone marking articulate with another bone and where?</th>
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(Alternative) Activity 1: Identify Labelled Bones and Bone Markings

Look at the bone models that your instructor has labelled.

1. What is the name of Bone 1?

Identify labelled features on Bone 1. Write below the number or letter that is marking that bone feature followed by that bone feature’s (marking’s) name.

Is Bone 1 a left or right bone?

2. What is the name of Bone 2?

Identify labelled features on Bone 2. Write below the number or letter that is marking that bone feature followed by that bone feature’s (marking’s) name.

Is Bone 2 a left or right bone?

3. What is the name of Bone 3?

Identify labelled features on Bone 3. Write below the number or letter that is marking that bone feature followed by that bone feature’s (marking’s) name.

Is Bone 3 a left or right bone?
Activity 2: Determine Right and Left Bones

<table>
<thead>
<tr>
<th>Bone</th>
<th>Marking and its normal orientation</th>
<th>Right</th>
<th>Left</th>
</tr>
</thead>
</table>
| Coxal bone | 1.  
|            | 2.  
|            | 3.  |       |      |
| Femur      | 1.  
|            | 2.  
|            | 3.  |       |      |
| Tibia      | 1.  
|            | 2.  
|            | 3.  |       |      |
| Fibula     | 1.  
|            | 2.  
|            | 3.  |       |      |

In blank boxes take notes or do other bones that your instructor additionally wants you to know the difference between right and left bones.

Activity 3: Articulating the Skeleton or Parts of the Skeleton

Your instructor or you will form groups. Within your group, pretend that you are on an archeological dig and you’ve found bones that you need to articulate to determine right from left bones and to determine if the bones have come from the same “person.”

Part 1: Articulate the bones at your station.

Part 2: Either identify the joint that the bones have formed, or if you have bones of an almost intact skeleton, name at least two types of synovial joints. Write the name of the type of synovial joint or the two types you labeled.

Part 3: Raise your hand for the instructor to check your articulations.
Activity 4: Scientific Method and Data Collecting: Can the length of the tibia predict the height of a person?

Part 1: Hypothesis Building and Data Collecting

Protocol for measuring tibia and height. Names of 2 person team:__________________

Can the length of a person’s tibia predict the height of a person?

What is your hypothesis for the question above? (this is the reason/explanation for your answer above)

Using the tape measure assigned to your 2 person teams, measure the tibia from the top of the tibial tuberosity to the distal end of the medial malleolus of the tibia. Record the measurement in inches for each person in the team.

Tibia length of partner 1 ________________ Tibia length of partner 2 ________________

Given your hypothesis, what is your prediction for the data that we are collecting in lab today? Do you expect to see a correlation with the tibia measurement and the height measurement that you are recording next?

Now with the same tape measure, measure the height of each partner. You can use the 12-inch ruler to better assess the height by resting the ruler perpendicular to the top of the partner’s head and record where it hits the tape measure length in inches. Do this for both partners in the team.

Height of partner 1:__________________ Height of partner 2:__________________
Data will be recorded in a spreadsheet and distributed to the class. You will graph the data to determine if it supports or does not support your hypothesis. This will be a homework assignment that will be due the lab after the midterm.

**Part 2: Graphing and Analysis of Data**

**Data analysis and next steps**

1. Graph the tibia length and height data from your class. You can do this either with graph paper or in excel workbook.

Paste your graph below:

2. Does the data support or not support your hypothesis?

3. How does the data either support or not support your hypothesis?

4. What would be the next question that you would ask to further your understanding of the relationship between skeletal organs and a person’s height? Be creative here and come up with a new interesting question.
Activity 5: Practicing and Identifying Movements

In a team of 2 or group of 3, practice and identify movements.

One person in the team will act out a movement. The other team member(s) will state what movement is being acted out.

Once you feel your team is confident with performing a movement and identifying it, write the movement below.

Now compare your list above with the movements on the first page of this lab. Is your team missing some?

If yes, write the missing movement below and act them out.