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Introduction

The Skeletal System

Shapes of Bones

Skull Bones

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Vertebrae (Spine) 2

Vertebrae (Spine) 3

Upper Limb Bones

Hip (Coxal) Bones

Lower Limb Bones

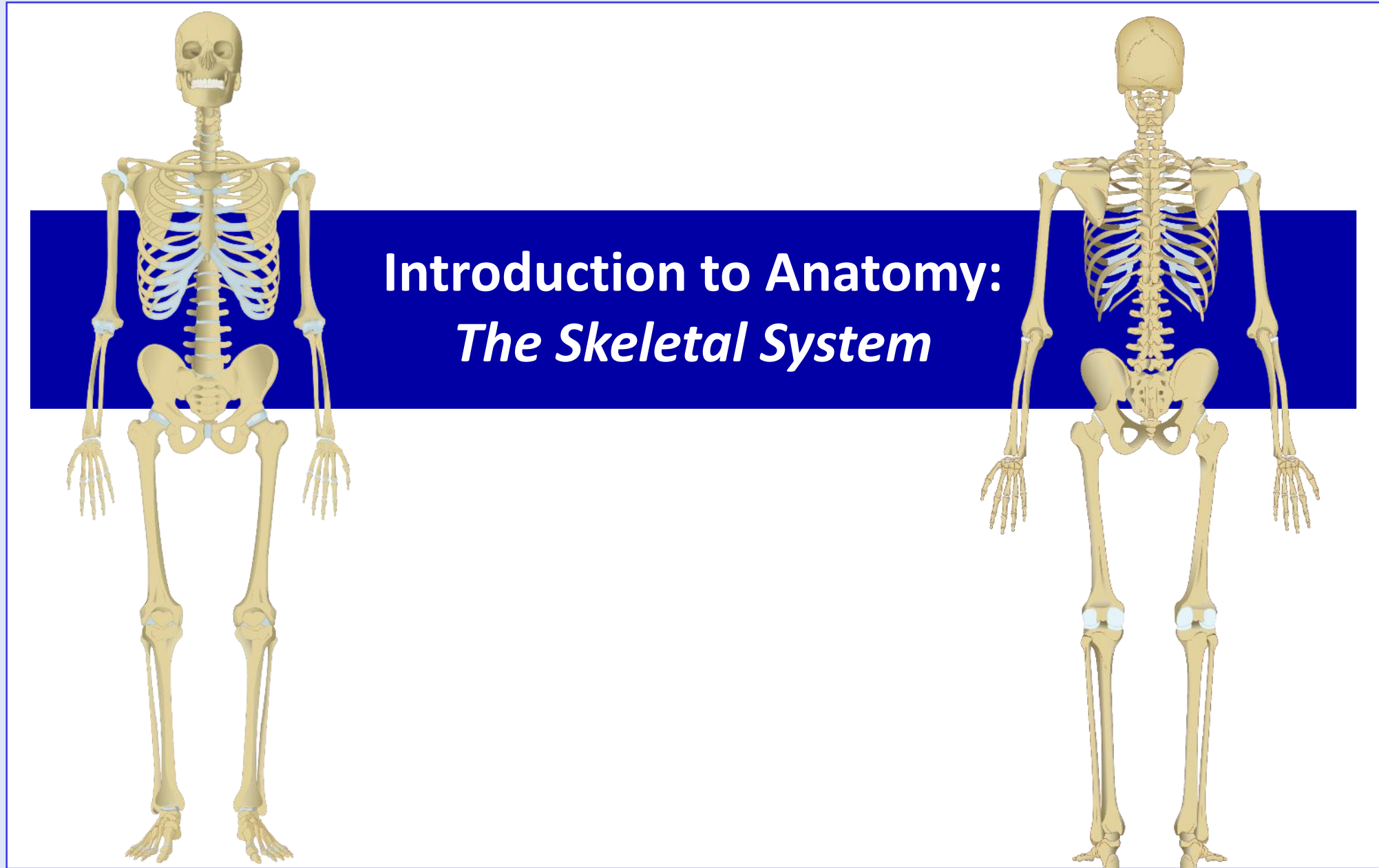
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When you first start studying Anatomy, it can feel a lot like trying to learn a new language! There are a lot of new concepts and words to learn, which can feel overwhelming.

This tutorial will introduce you to the skeletal system. It provides information about the functions of the skeletal system, the shapes of bones, and introduces the major bones of the skeleton. The goal is to provide a basic foundation you can build upon as you learn and become more confident with Anatomy.

Each labelled slide is followed by an unlabelled one, allowing you to practice.

There are two quizzes at the end of this module to help test your knowledge.

Good luck!

Navigation

There are two ways to move through this module:

- 1) Scroll through the PDF*
- 2) Click on the title headings on the left side of the screen (Note: this will take you to the first/labelled page in each section; scroll down to find the unlabelled page)*

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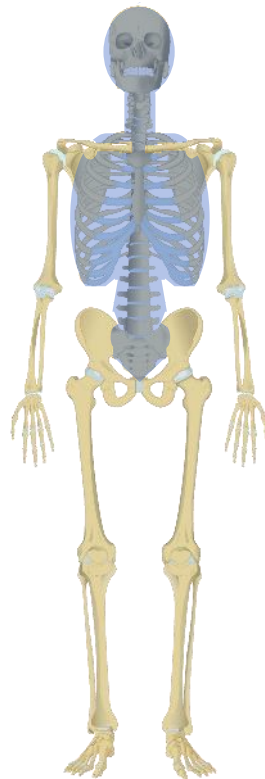
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The **Skeletal System** has many important functions:

- Providing support for the body
- Storing minerals (calcium, phosphate)
- Producing red blood cells
- Protecting the organs and tissues
- Allowing movement (the bones act as levers)



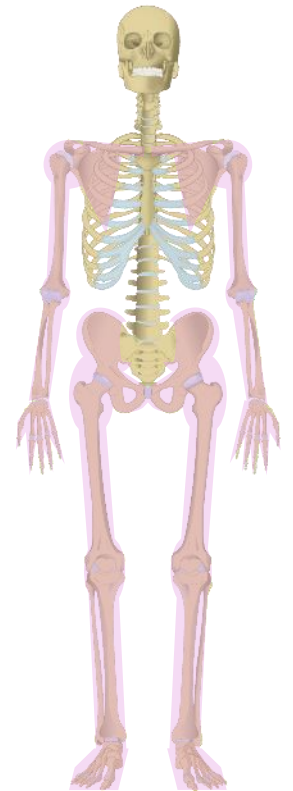
The skeleton can be subcategorized into two divisions:

The ***Axial Skeleton*** (*left, in blue*)

Includes: Bones of the skull, vertebrae, sternum, ribs, and sacrum

The ***Appendicular Skeleton*** (*right, in pink*)

Includes: Bones of the upper and lower limbs, scapula, clavicles, and hip bones,



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Bones can be classified according to their **shape**:

Long Bones

Bones that are longer than they are wide

Examples: Humerus

Short Bones

Bones that are as wide as they are long

Example: Carpal bones in the hands

Irregular Bones

Bones that have complex, irregular shapes

Example: Spinal vertebrae

Flat Bones

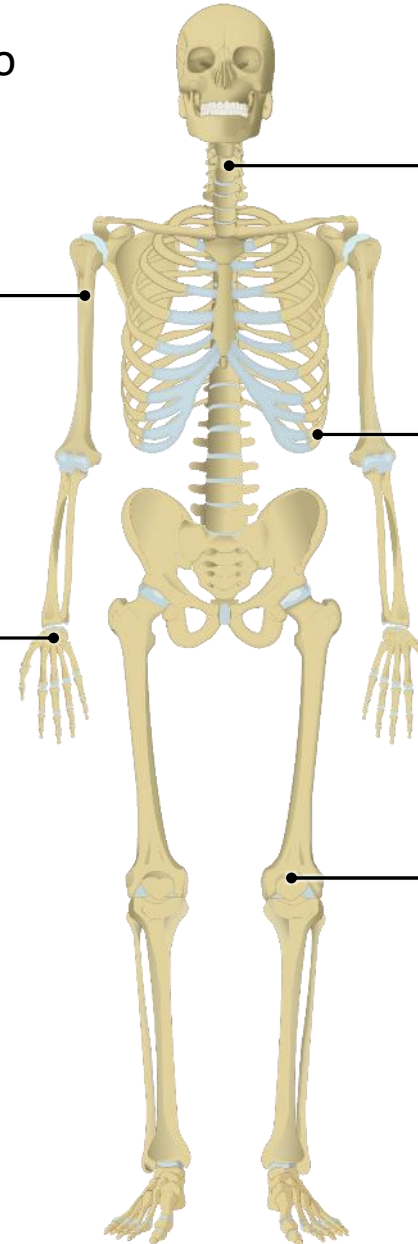
Bones that are flat and light

Example: Rib bones

Sesamoid Bones

Bones that are flat, small, and round

Example: Patella (kneecap)



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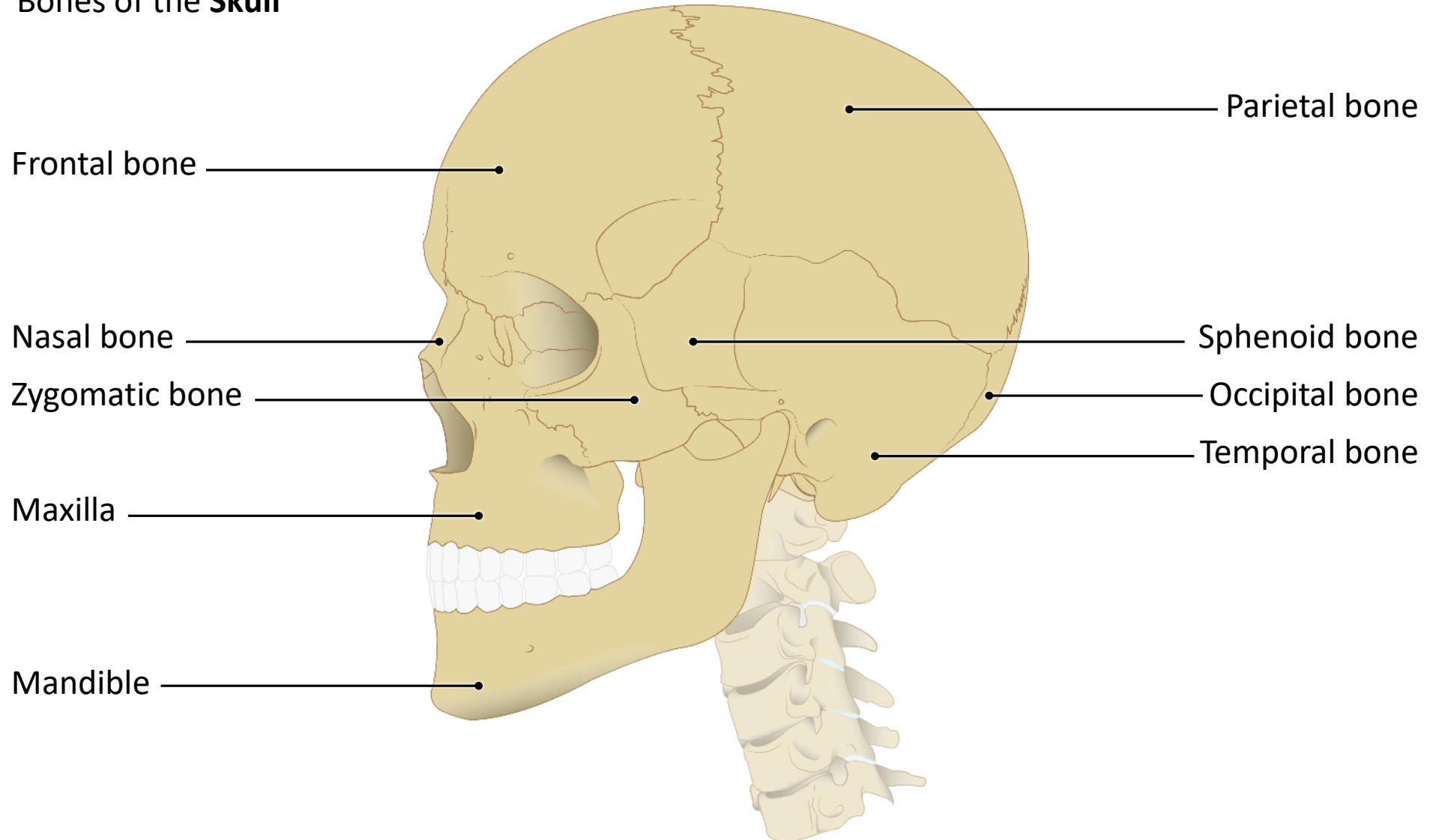
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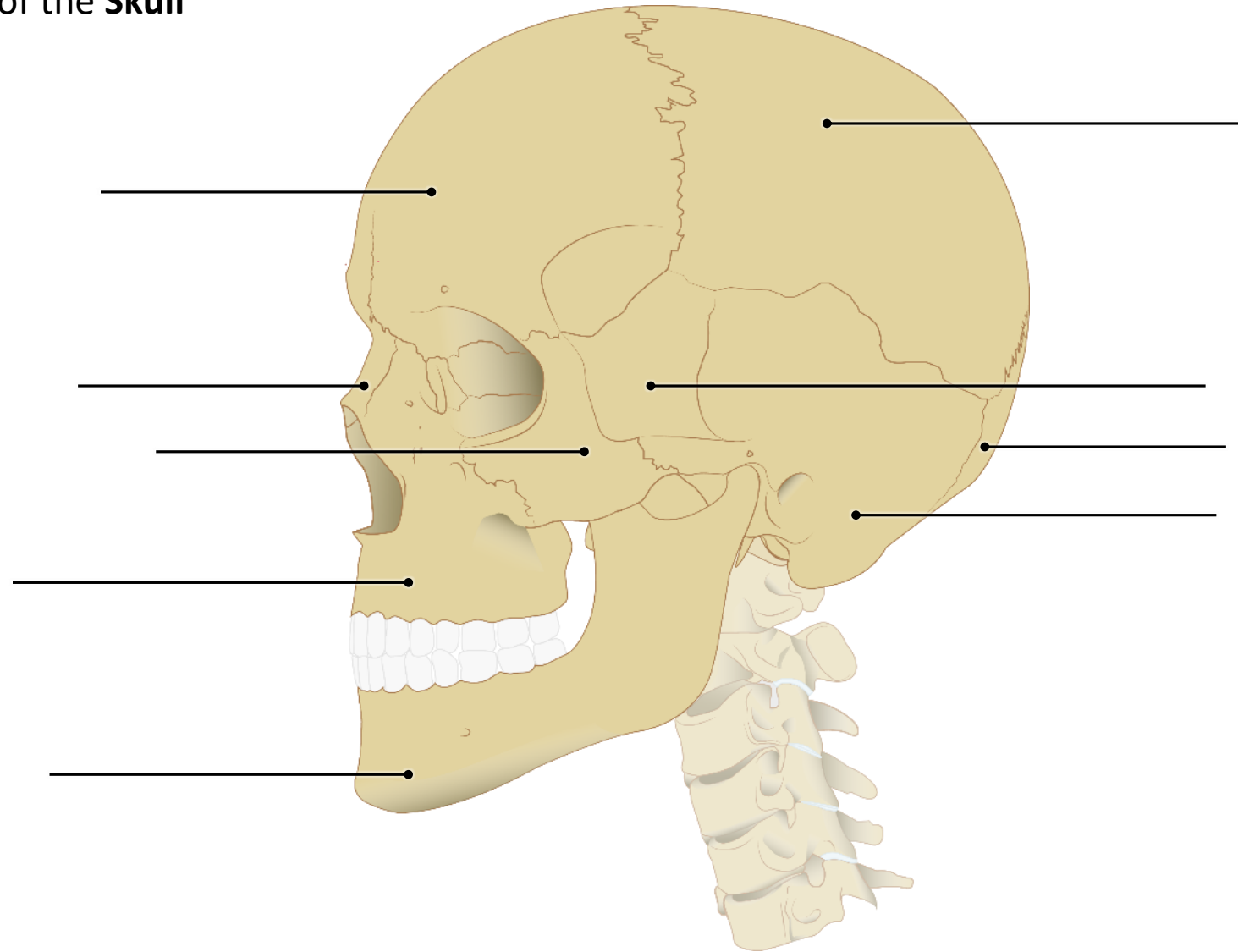
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Spinal Vertebrae

The Spinal Vertebrae are categorized into 5 types/regions:

Memorization Hint:

To remember the number of bones in the **CERVICAL**, **THORACIC**, and **LUMBAR** spine, use the following memory aid:

Cereal (**CERVICAL**) for breakfast at 7:00 am

Tasty lunch (**THORACIC**) at 12:00 pm

Light dinner (**LUMBAR**) at 5:00 pm

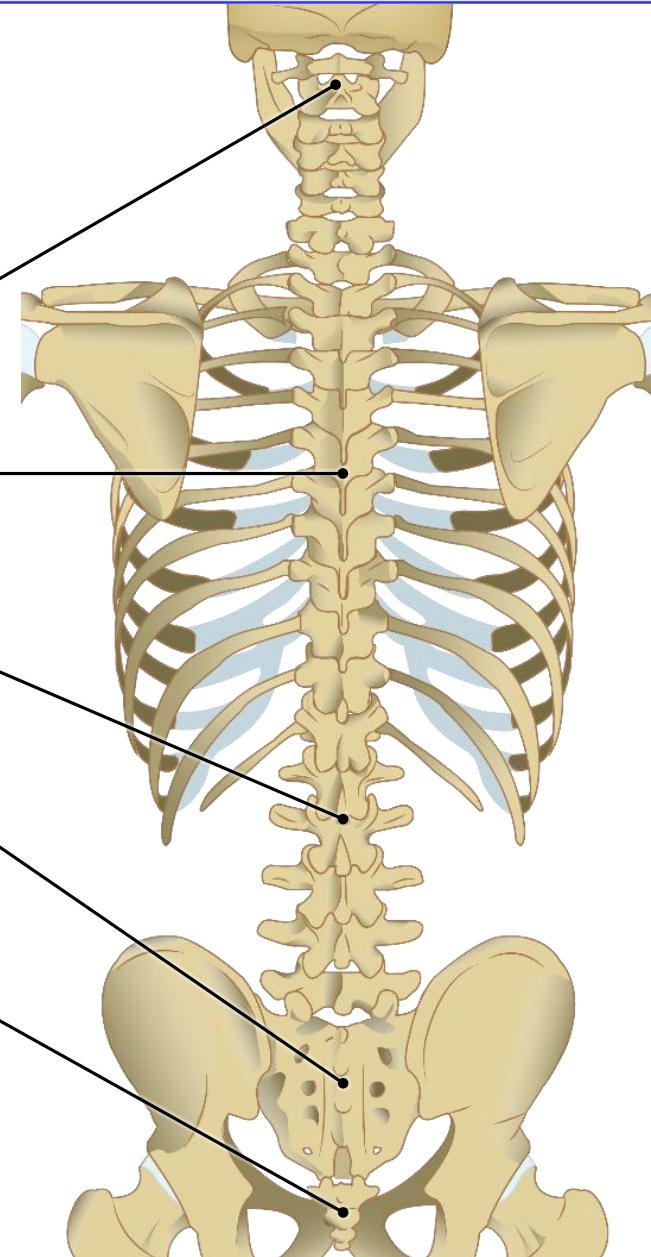
Cervical: 7 Bones

Thoracic: 12 bones

Lumbar: 5 Bones

Sacrum: 5 fused bones

Coccyx (Tail bone): 3-5 fused bones



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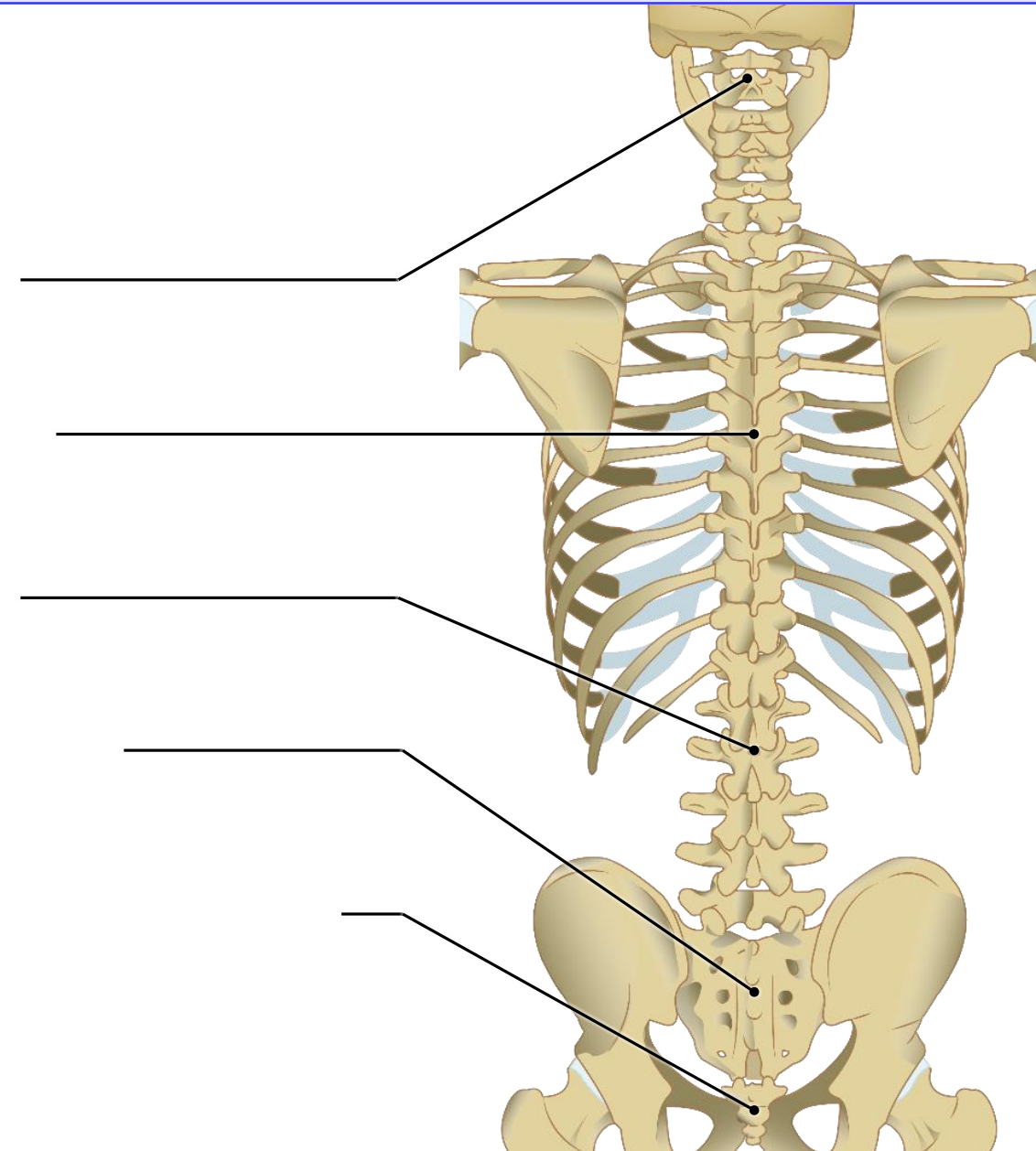
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Spinal Vertebrae



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Cervical Vertebrae

There are three types of cervical bones:



C1/Atlas

Articulates with the Skull
Allows nodding (“Yes”)



C2/Axis

Articulates with C1 (Atlas)
Allows rotation of head (“No”)



C3-C7

Memorization Hint:

In Greek mythology, Atlas was a Titan who led a (failed) rebellion against Zeus. As punishment, Atlas was condemned to carry the weight of the world on his shoulders for eternity. Imagine **C1/Atlas** as holding up the weight of the head, which is spherical and heavy like a globe.



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Thoracic, Lumbar, and Sacral Vertebrae



Thoracic
12 bones

Long spinous processes
Articulate with the ribs



Lumbar
5 bones

Thick vertebral bodies



Sacrum

5 fused bones
Articulates with Coxal bones

Did You Know?

The bones of the **SACRUM** start to fuse at puberty, and are fully fused by 25-30 years of age.

The bones of the **COCCYX** (not pictured) begin to fuse at around age 26, and are not fully fused until late life.

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Bones of the **Upper Limb**

Memorization Hint:

The **RADIUS** is rad!

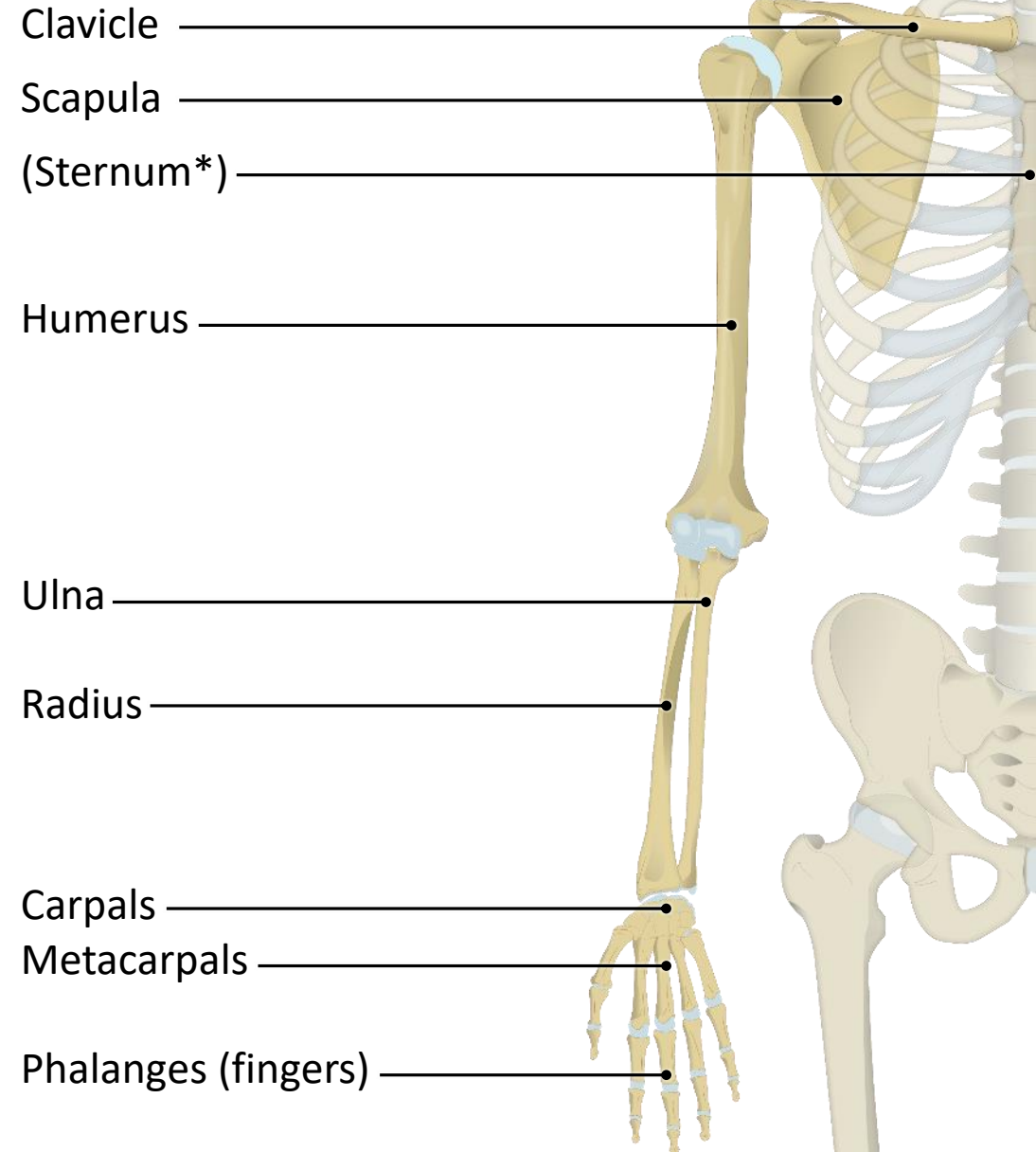
The **RADIUS** is the forearm bone closest to your thumb. Give a thumbs up to get oriented! 👍

Did you know?

When you hit your funny bone, it feels strange and **HUMERUS**.

The tingling sensation you feel is produced when the **Ulnar Nerve** is compressed against the **HUMERUS** bone. 🤕

* The Sternum is not a bone of the upper limb. It is included here for reference.



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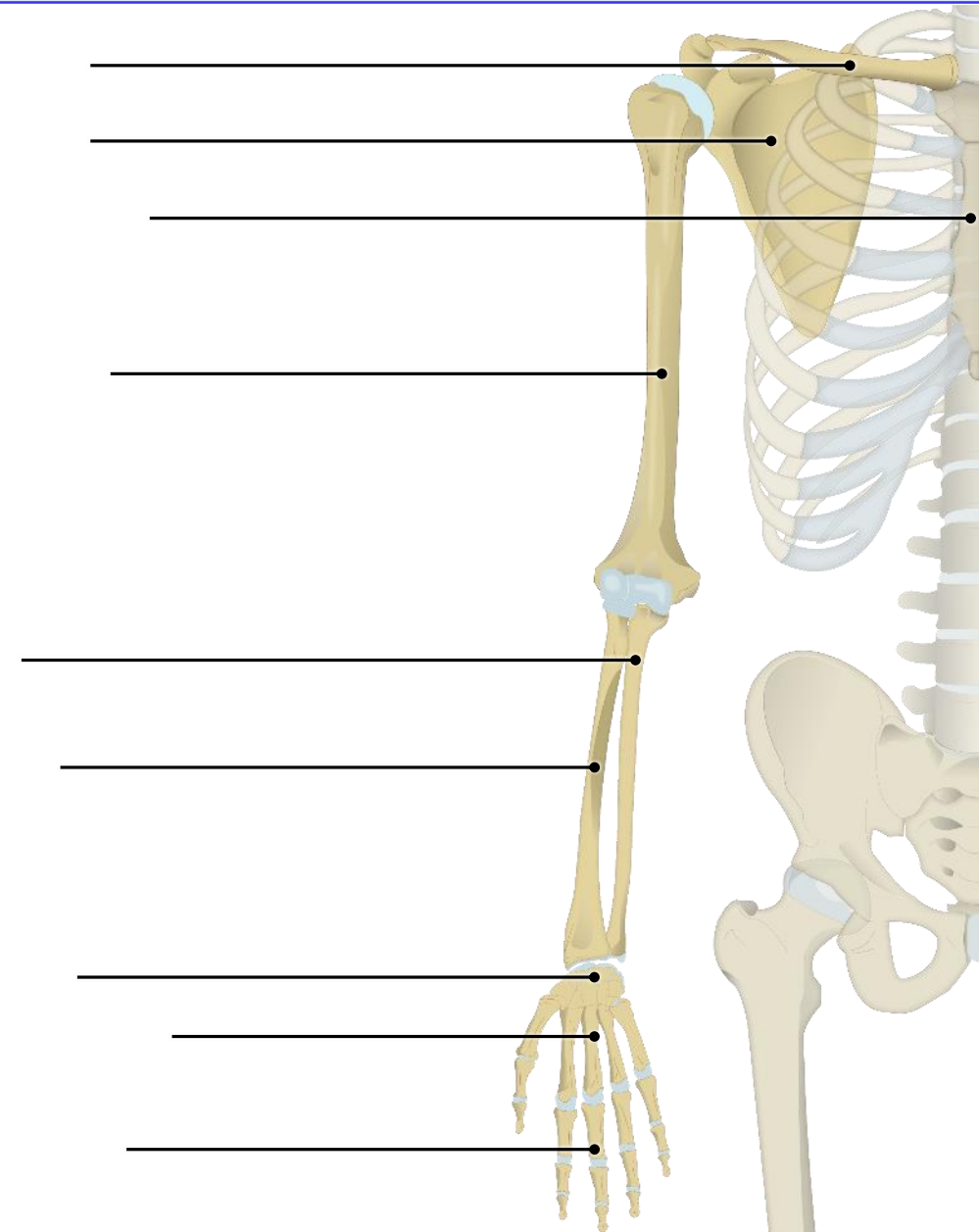
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Bones of the **Upper Limb**



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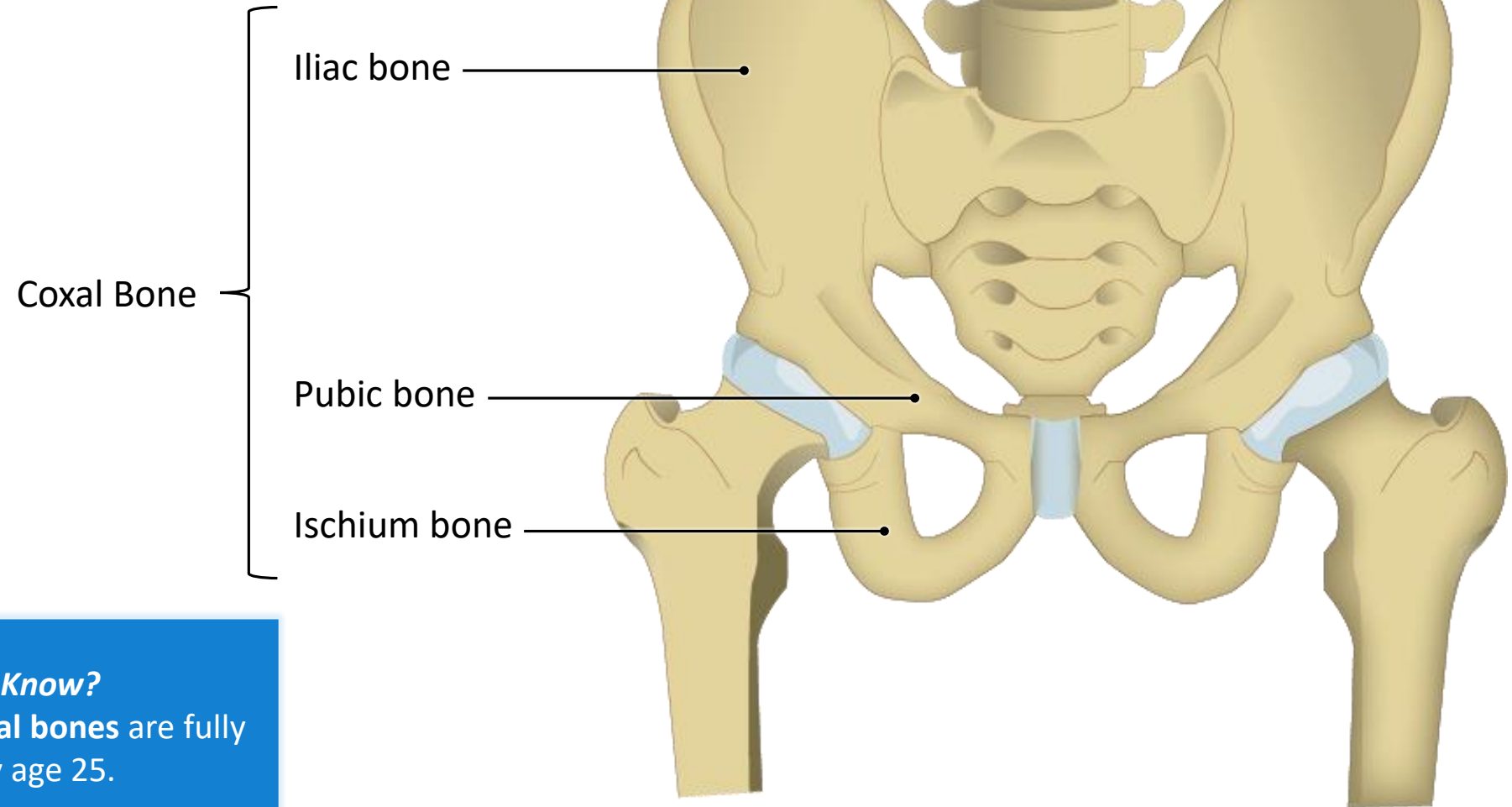
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Coxal bones (also called **Hip bones**, **Pelvic bones**)

The **Coxal bones** are comprised of three bones:



Did You Know?
The **Coxal bones** are fully fused by age 25.

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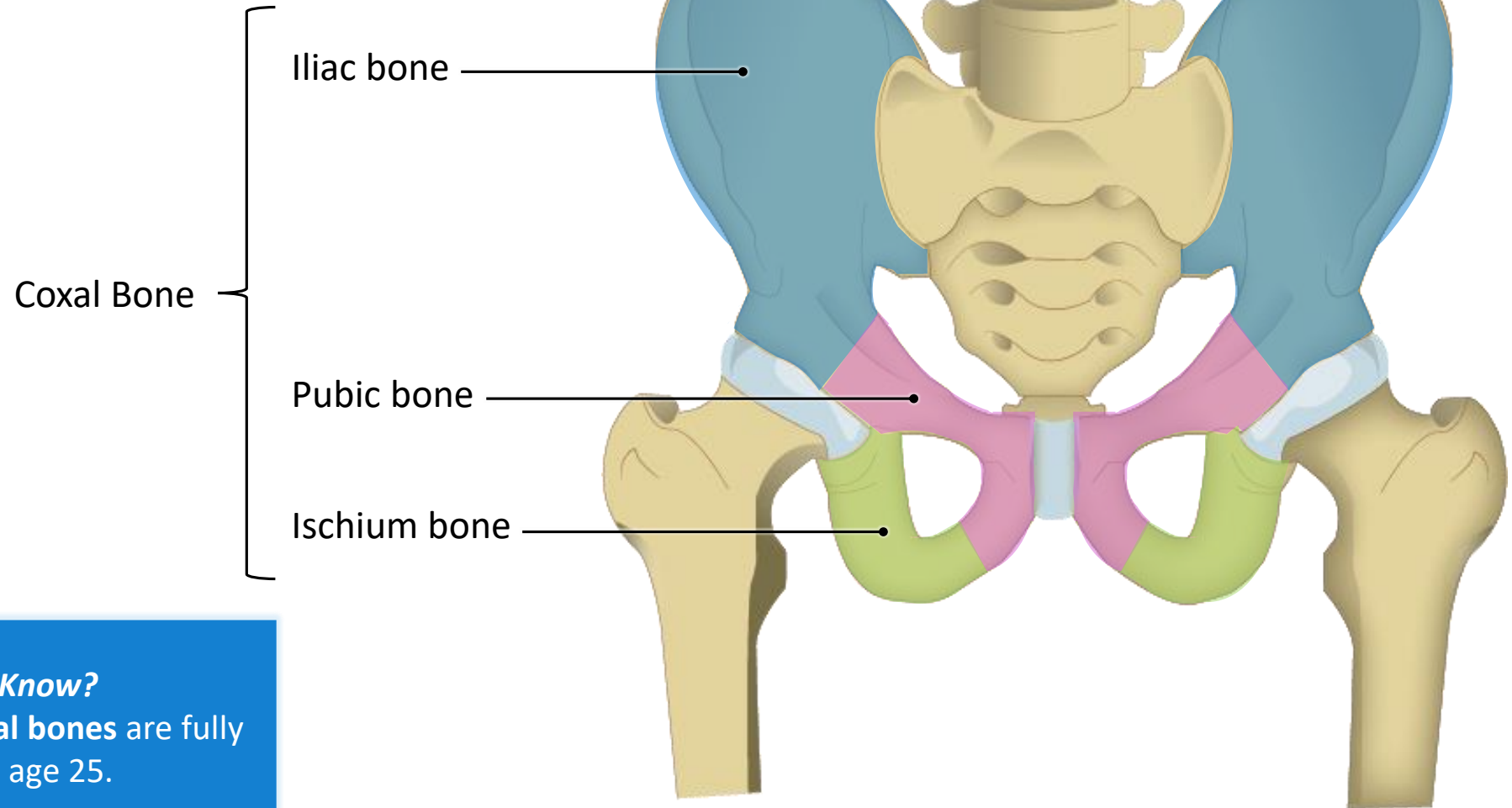
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Coxal bones (also called **Hip bones**, **Pelvic bones**)

The **Coxal bones** are comprised of three bones:



Did You Know?
The **Coxal bones** are fully fused by age 25.

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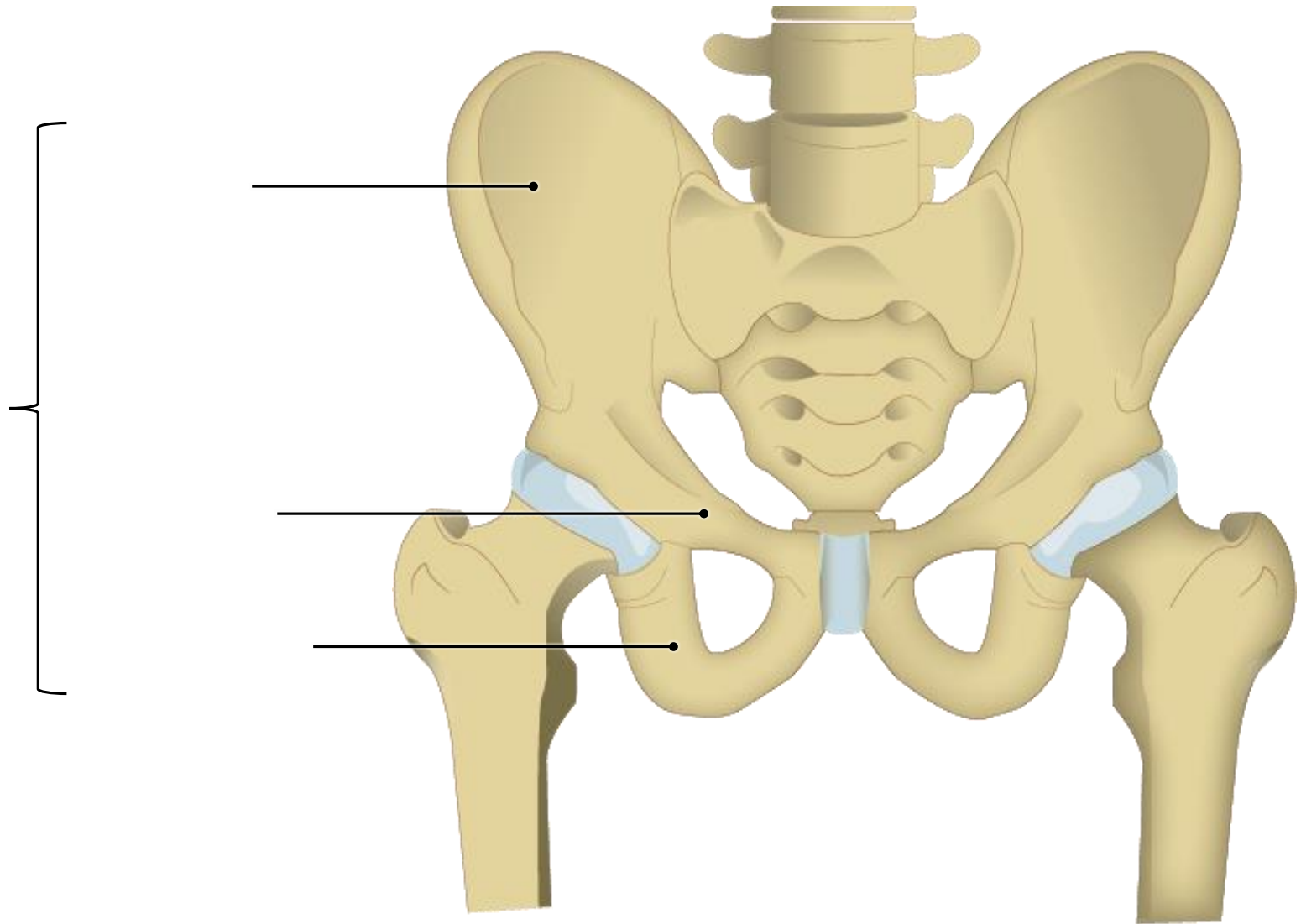
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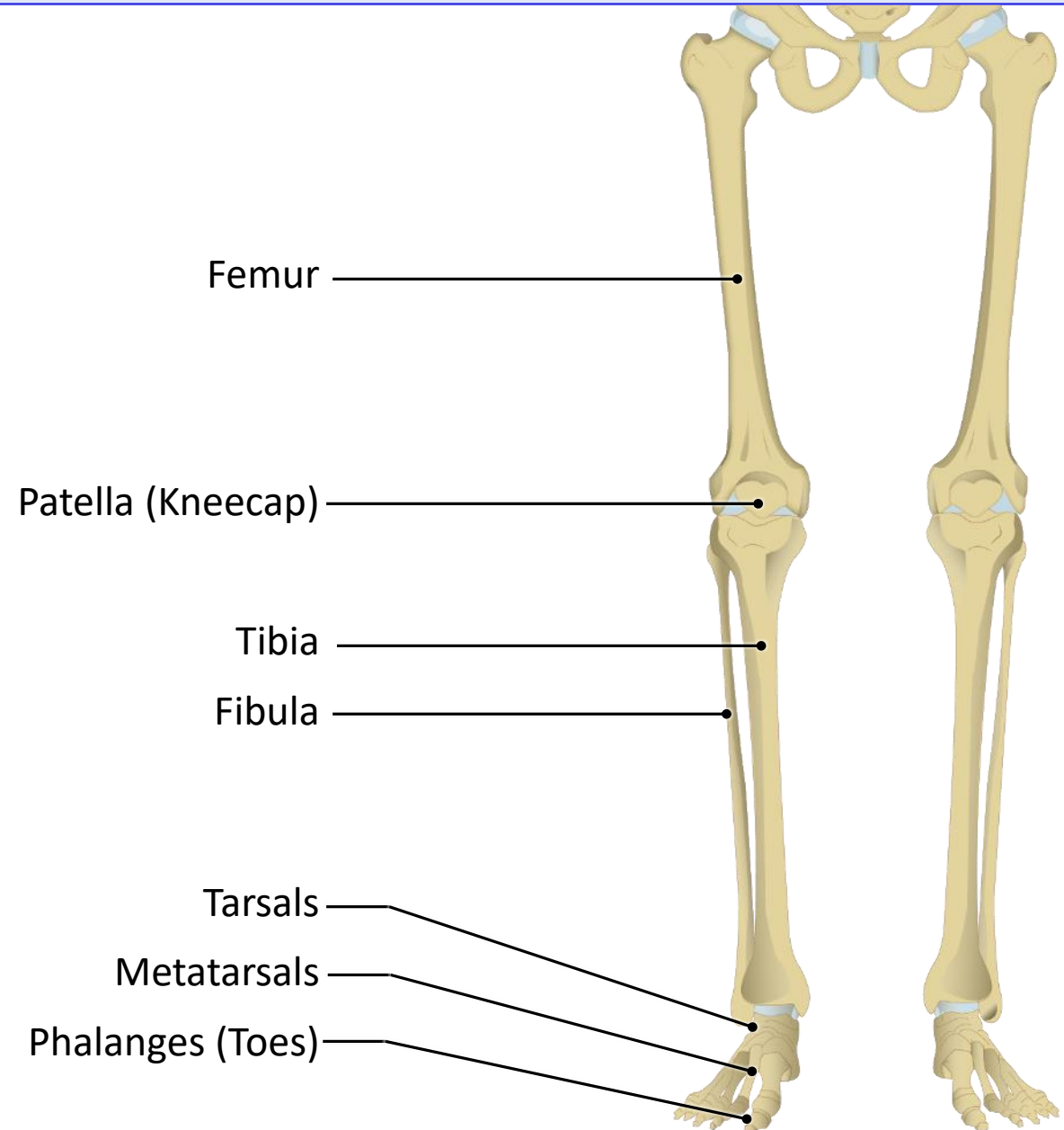
Bones of the **Lower Limb**

Memorization Hint:

The **PATELLA** is a *Sesamoid bone*. Think of it as shaped like a giant upside-down sesame seed. 💧

Did you know?

The **FEMUR** is the longest bone in the body. Its length is roughly 1/4th that of a person's total height! 📏



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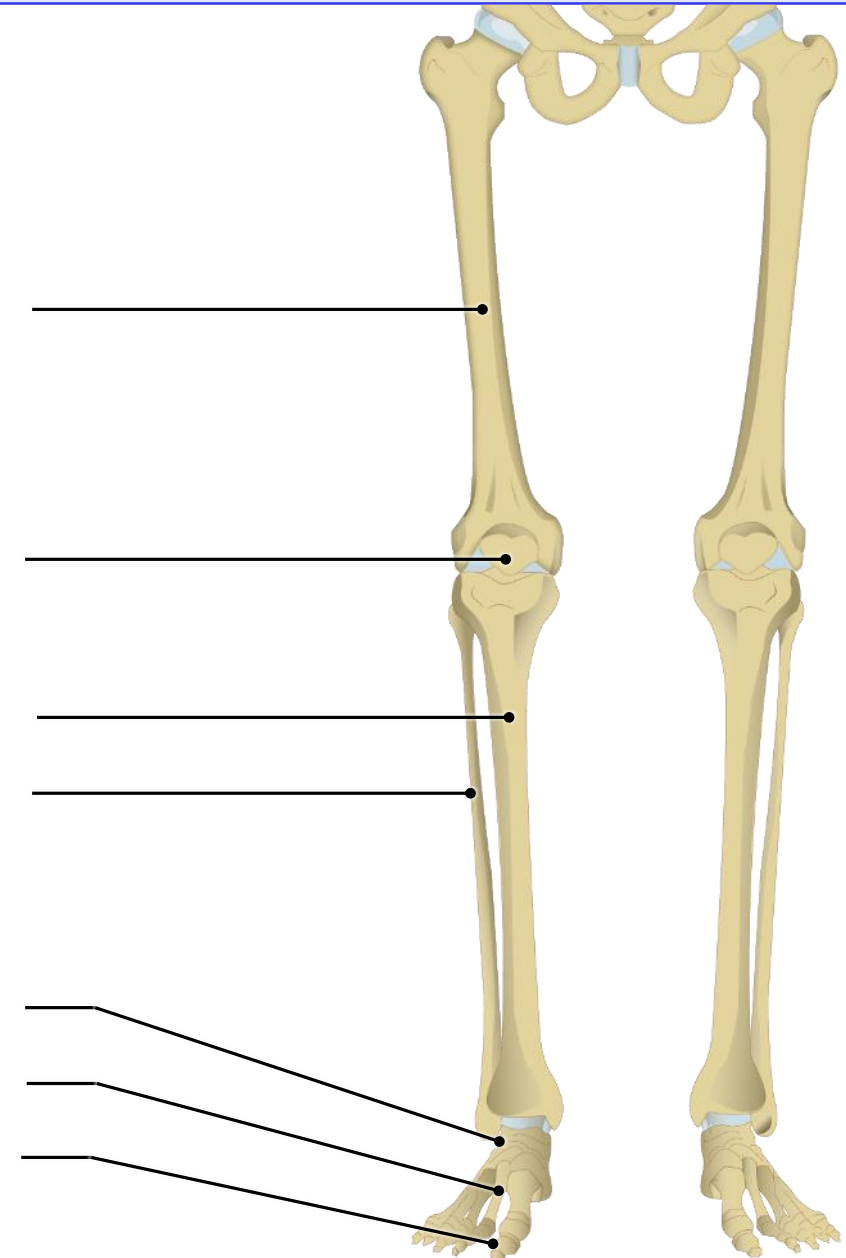
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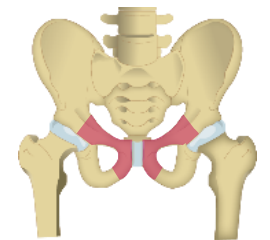
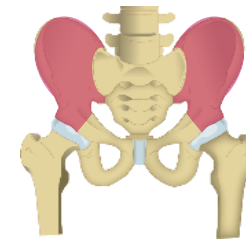
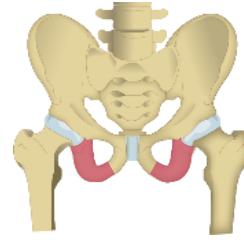
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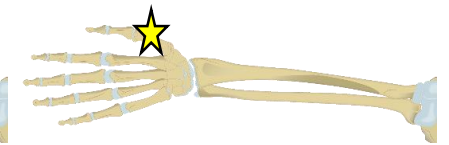
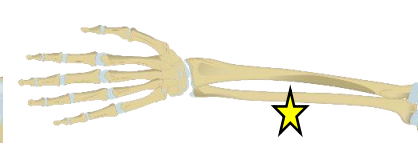
Choose the correct Anatomical region:

(Write your answers on paper and check with the Quiz Answer Key at the end)

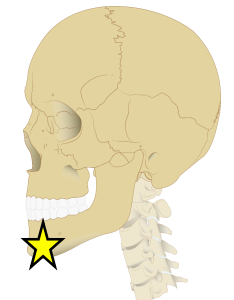
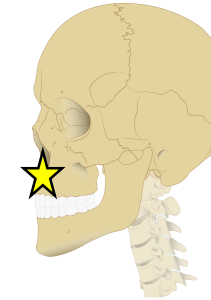
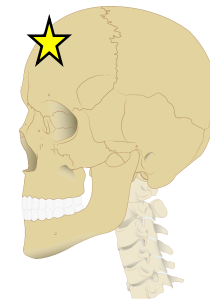
1) Pubic bone



2) Radius



3) Mandible



4) C1/Atlas (Cervical Vertebrae)



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Quiz 2

Match:

(Write your answers on paper and check with the Quiz Answer Key at the end)

- | | |
|--|--------------------------|
| 1) Long bone of the Upper Limb | A) Phalanges |
| 2) Sesamoid bone | B) Flat bone(s) |
| 3) Anatomical name for bones of Fingers | C) Five |
| 4) Anatomical name for Hip Bones | D) Femur |
| 5) Includes Skull, Vertebra, Sternum, Ribs | E) Appendicular Skeleton |
| 6) Skull bones are this shape | F) Humerus |
| 7) Number of fused bones in Sacrum | G) Axis |
| 8) Long bone of the Lower Limb | H) Ischium |
| 9) Includes Limb bones, Scapula, Hip bones | I) Axial Skeleton |
| 10) Number of Thoracic vertebrae | J) Coxal Bones |
| 11) Name of C2 Cervical Bone | K) Twelve |
| 12) Name of one of the Coxal Bones | L) Patella (Kneecap) |

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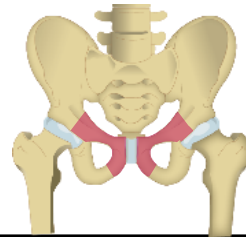
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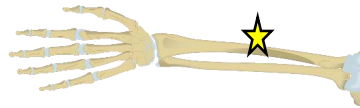
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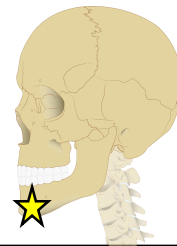
1) Pubic Bone



2) Radius



3) Mandible



4) C1/Atlas



Quiz 2 Answers

| | |
|--|--------------------------|
| 1) Long bone of the Upper Limb | F) Humerus |
| 2) Sesamoid bone | L) Patella (Kneecap) |
| 3) Anatomical name for bones of Fingers | A) Phalanges |
| 4) Anatomical name for Hip Bones | J) Coxal Bones |
| 5) Includes Skull, Vertebra, Sternum, Ribs | I) Axial Skeleton |
| 6) Skull bones are this shape | B) Flat bones |
| 7) Number of fused bones in Sacrum | C) Five |
| 8) Long bone of the Lower Limb | D) Femur |
| 9) Includes Limb bones, Scapula, Hip bones | E) Appendicular Skeleton |
| 10) Number of Thoracic vertebrae | K) Twelve |
| 11) Name of C2 Cervical Bone | G) Axis |
| 12) Name of one of the Coxal Bones | H) Ischium |

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Bones found in this module, organized alphabetically by *shape*:

| Flat | Irregular | Long | Short | Sesamoid |
|-------------|-------------|-------------|---------|----------|
| Rib bones | Coxal Bones | Femur | Carpals | Patella |
| Scapulae | Vertebrae | Fibula | Tarsals | |
| Skull bones | | Humerus | | |
| Sternum | | Metacarpals | | |
| | | Metatarsals | | |
| | | Phalanges | | |
| | | Tibia | | |

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Supervisor: Kurt McBurney, Associate Teaching Professor, Island Medical Program

Inspired by EPHE 141 Human Anatomy Lab and the EPHE 141 Lab Manual (University of Victoria)

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