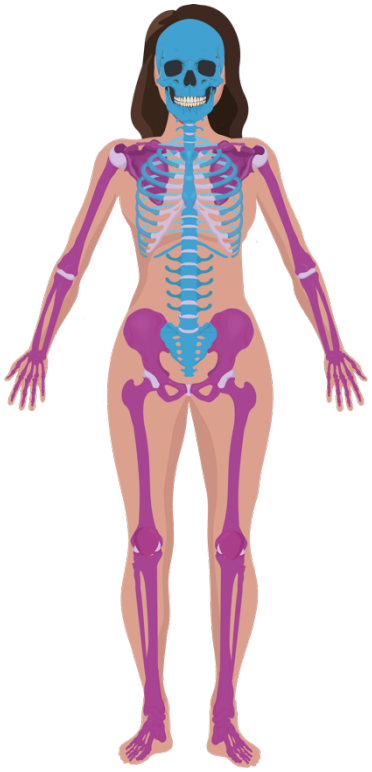

Study Prep
Available on Pearson+

Study Prep
Available on Pearson+

TOPIC: INTRODUCTION TO THE SKELETON



- **Skeletal system:** the bones, cartilages, joints, and ligaments of the body.
- There are _____ named bones in the body.
  - Exact number varies by _____ and by individual.
- **Axial skeleton:** Skull, spinal column, _____ (80 bones).
  - Structure of the body & protection of internal organs.
- **Appendicular skeleton:** Limbs + pectoral & _____ girdles (126 bones).
  - Provide _____.

PRACTICE: Identify which answer correctly distinguishes between the axial and appendicular skeleton.

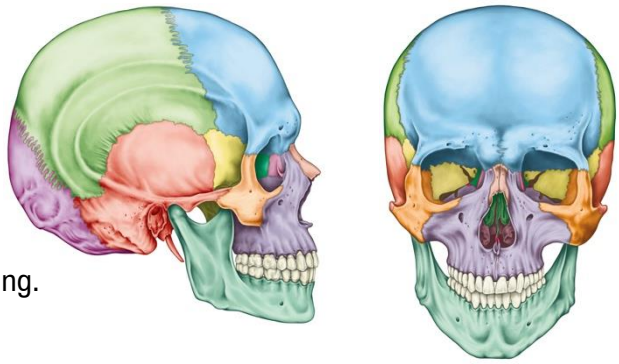
a) Axial: Ribs, spine, hip bones. Appendicular: Shoulder blades, finger bones, metatarsals.

b) Axial: Skull, tail bone, ribs. Appendicular: Shoulder blades, wrist bones, knee cap.

c) Axial: Heel bone, femur, hip bones. Appendicular: Spine, ribs, skull.

d) Axial: Carpals, sacrum, humerus. Appendicular: Ribs, hip bones, femur.

TOPIC: THE SKULL



Introduction to the Skull

- The skull is a complex bony structure, includes:
  - **Cranial bones**: bony house for the _____.
  - **Facial bones**: structure of the _____.
  - **Associated bones**: bones used for _____ and swallowing.
  - **Cavities & Sinuses:** _____.

- The bones of the skull perform many functions:

1) Protect the _____.	**2) Create** _____ structures.	**3) Openings** for ____ and food.	**4) Anchor** teeth.	**5) House** _____ organs.
				

PRACTICE: True or False; if false, select the answer that best corrects the statement.

Associated bones provide a house for the brain.

a) True, the associated bones make up the cranium.

b) False, the associated bones provide the structure of the ear and nose.

c) False, the associated bones are involved in hearing and swallowing.

d) False, the associated bones create facial features.

Study Prep
Available on Pearson+

TOPIC: THE SKULL

Overview of Cranial Bones

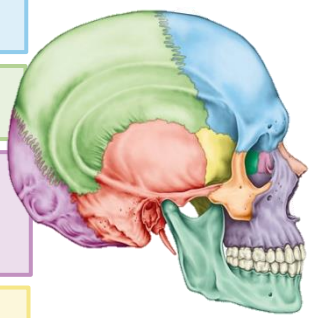
- Cranium is made of _____ bones: connected by **sutures**.

1. Frontal (1): _____ bone.

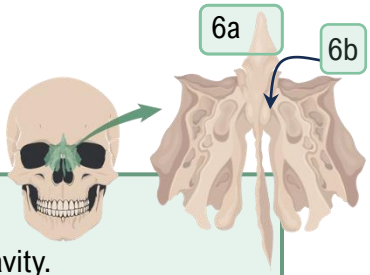
2. Parietal (2): upper _____ of the head.

3. Occipital (1): _____ of your head.
- Foramen Magnum: spinal cord opening.

4. Temporal (2): where your _____ are.
- Auditory Meatus: canal into the ear.
- Processes: styloid, mastoid, zygomatic.

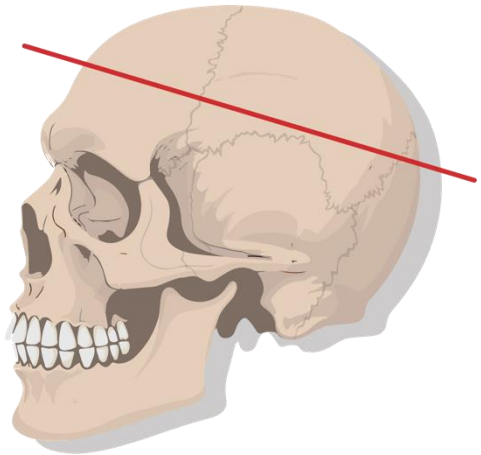


5. Sphenoid (1): looks like a _____, makes up the front wall of cranium.
- 5a. Sella turcica: houses _____.



6. Ethmoid (1): _____ like bone between orbits & nasal cavity.
- 6a. Cristi galli: brain membrane _____.
- 6b. Cribriform plate: foramina for olfactory nerves.

EXAMPLE: To remove the brain as part of an autopsy, the top of the skull will be removed by cutting roughly along the red line as shown in the diagram. Which bones would be cut as part of this procedure?



_____

_____

TOPIC: THE SKULL

PRACTICE: If a patient has a tumor on the pituitary gland, a surgeon will often make an incision in the nose before cutting into which bone to reach the pituitary?

a) Frontal.
b) Sphenoid.
c) Occipital.
d) Temporal.

PRACTICE: Damage to which bone is most likely to cause problems with hearing?

a) Frontal.
b) Sphenoid.
c) Occipital.
d) Temporal.

TOPIC: THE SKULL

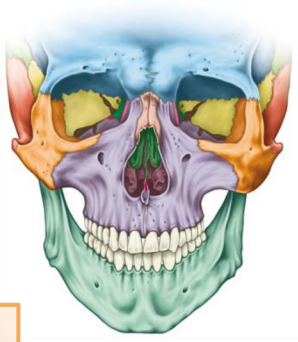
Overview of Facial Bones

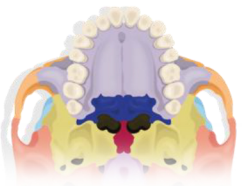
- Face is made up of _____ bones, many of them paired:

1. Maxilla (1): main facial bone.
- Attachment site for _____.

2. Mandible (1): _____ jaw.
- Attachment site for teeth.

3. Zygomatic (2): _____ bones.
- Zygomatic arch touches temporal bone.





4. _____ (2): bridge of the nose.

5. Lacrimal (2): Inner wall of _____ .
- Lacrimal fluid is tears–near eyes.

6. Inferior Nasal Conchae (2): walls of the _____ cavity.

7. Vomer (1): part of nasal _____.

8. Palatine (2): _____ of your mouth.

EXAMPLE: In a cleft palate, the roof of the mouth (or palate) does not fuse properly during development. Without surgical correction, a cleft palate can lead to complications surrounding feeding, ear infections and hearing, and speech.

What bones would you expect may be surgically repaired in the case of a cleft palate?

_____

_____

PRACTICE: During a baseball game, the batter hit's a line drive that strikes the pitcher directly in the face breaking a bone. Among the four bones listed, which bone would you expect to be the *least* likely to be the bone that is broken in this situation?

a) Zygomatic.
b) Mandible.
c) Maxilla.
d) Lacrimal Bone.

TOPIC: THE SKULL

PRACTICE: If you are moving the only freely moving bone in the skull, what activity are you doing and what bone are you moving?

a) Humming; the palatine bone.

b) Chewing; the mandible.

c) Crying, the lacrimal bone.

d) Sneezing, the ethmoid bone.

TOPIC: THE SKULL

Cavities of the Face

● Cranial _____ facial bones come together to form functional cavities:

■ Nasal cavity: _____ holes:

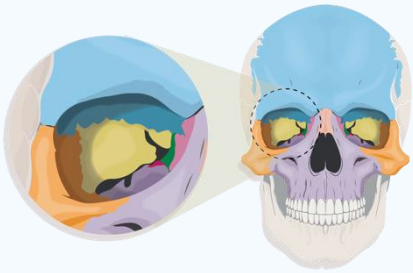
- **M**axilla
- **N**asal
- **S**phenoid
- **V**omer
- **I**nferior Nasal Conchae
- **P**alatine
- **E**thmoid

***M**y **N**ose **S**mells **V**ery **I**nteresting **P**erfume **E**xtracts.*

● *Septum*: Separates R & L side of nose: made of cartilage, ~~ethmoid~~_____ bone and ~~vomer~~vomer.

■ Orbital cavity: _____ holes:

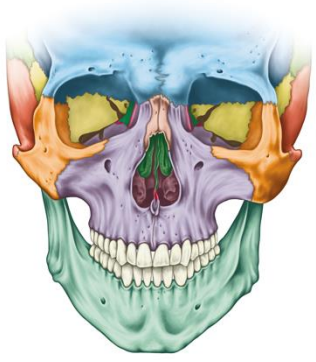
- **M**axilla
- **L**acrimal
- **E**thmoid
- **S**phenoid
- **P**alatine
- **F**rontal
- **Z**ygomatic



***M**y **L**ittle **E**ye **S**pies **P**retty **F**ast **Z**ebras.*

EXAMPLE: The following lists each have *at least* one bone that does not belong. Cross out any bones that do not belong.

Bones that contribute to the *nasal cavity.*	Bones that contribute to the *orbital cavity.*	Bones that *anchor teeth.*
a) Zygomatic b) Ethmoid c) Vomer d) Maxilla	a) Lacrimal b) Sphenoid c) Zygomatic d) Mandible	a) Ethmoid b) Maxilla c) Palatine d) Mandible



PRACTICE: One of the occupational hazards of boxing is a deviated septum, where the cartilage of the septum is damaged shifted to one side. What two bones may also be involved in a deviated septum?

a) The vomer, sphenoid, and ethmoid bones.
b) The sphenoid and ethmoid bones.
c) The vomer and sphenoid bone.
d) The vomer and ethmoid bone.

TOPIC: THE SKULL

PRACTICE: Which bone creates the lateral wall of the orbital cavity?

a) Zygomatic.

b) Lacrimal.

c) Sphenoid.

d) Maxilla.

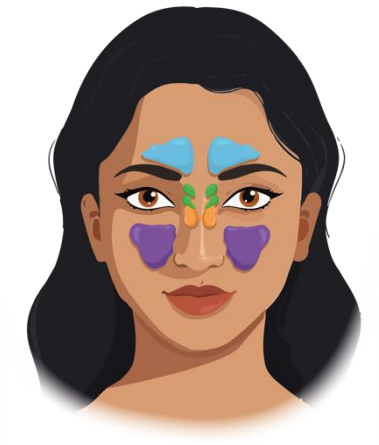
TOPIC: THE SKULL

Overview of Sinuses

- **Sinuses**: air filled cavities lined with mucosa, _____ of bones, connected to nasal cavity.
- Function to:

1) _____ the skull.	2) **Warm &** _____ air.	3) **Enhance** vocal resonance.
		

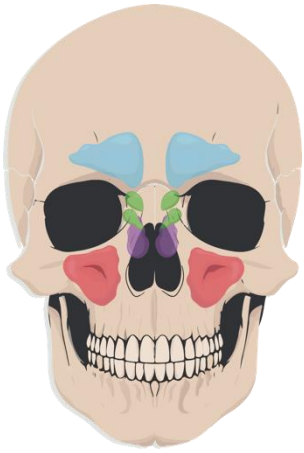
- **Paranasal Sinuses** found in the:
  - **F**rontal Bone — Frontal Sinus
  - **E**thmoid Bone — Ethmoid Air Cells
  - **M**axilla — Maxillary Sinus
  - **S**phenoid Bone — Sphenoidal Sinus



EXAMPLE: Dmitry is traveling on a plane while suffering from a cold. As the plane takes off, he begins to feel pressure and develops and intense pain just above the medial side of his right eye. What might the source of this pain be?

_____

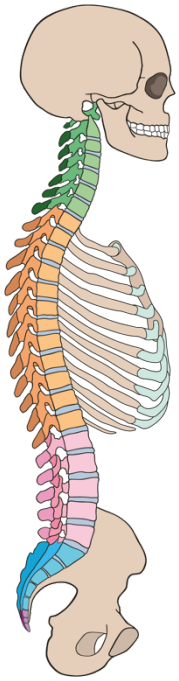
_____



PRACTICE: Which of the following bones is both classified as a facial bone and also contains a sinus?

a) Palatine bone. b) Nasal bone. c) Frontal. d) Maxilla.

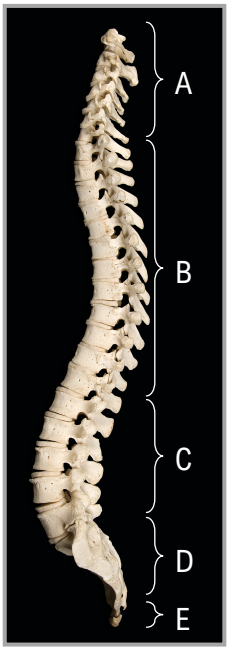
TOPIC: THE SPINE



- **Spine (Vertebral Column)**: 24 vertebrae, sacrum & coccyx.
  - **Cervical vertebrae**: (7) _____, *C1-C7*
    - Atlas: C1, holds up head *like atlas holding up the heavens.*
    - Axis: C2, allows the head to turn *on an axis.*
  - **Thoracic vertebrae**: (12) articulate with _____, *T1-12.*
  - **Lumbar vertebrae**: (5) _____ back, *L1-5*.
  - **Sacrum**: part of _____, 5 _____ vertebrae, *S1-5.*
  - **Coccyx**: _____ bone, 3-5 tiny, fused vertebrae.

- 4 curvatures: Cervical, thoracic, lumbar, and sacral — acts like a _____.
- **Intervertebral discs**: connective tissue _____ between vertebrae
  - *Absent between _____ and _____.*

EXAMPLE: Match the section of the spine to the type of vertebrae, fill in the number of vertebrae found in that section, and determine if the curve of the spine is concave or convex posteriorly in that region.



	Letter from diagram	# of bones in region	Curvature: Concave or convex posteriorly
Cervical			
Coccyx			
Lumbar			
Sacrum			
Thoracic			

PRACTICE: In a skiing accident, Marcio broke his T2 and T3. Where is his injury?

a) In his neck.
b) In the middle of his back.
c) In his upper back.
d) In his lower back

TOPIC: THE SPINE

PRACTICE: Which part of the spine will have fewer individual bones as you age?

a) Cervical vertebrae

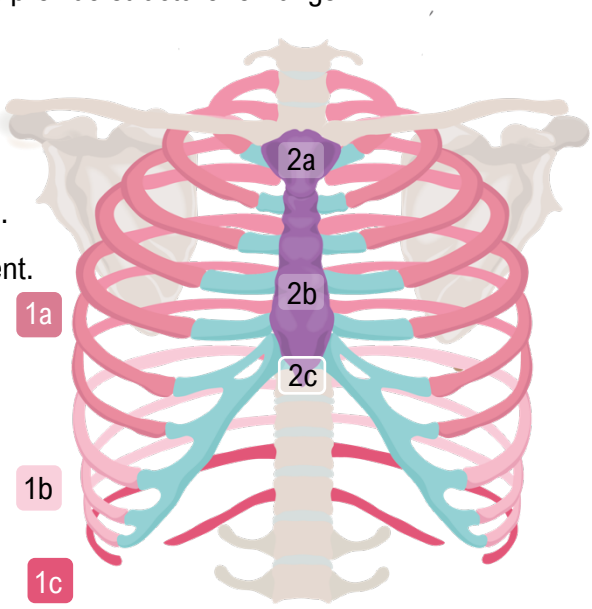
b) Thoracic vertebrae

c) Lumbar vertebrae

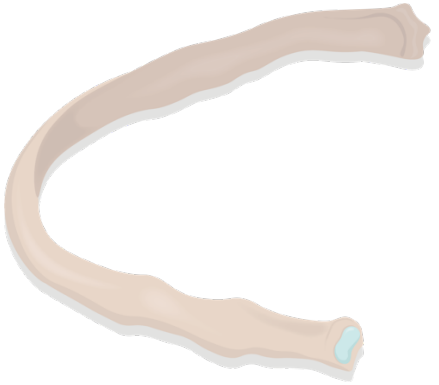
d) Sacrum

TOPIC: THE THORACIC CAGE

- Thoracic Cage (_____ cage) — _____ thoracic cavity & provide structure for lungs.
- Consists of the thoracic vertebrae plus the:
  1. **Ribs**: 12 _____ of flat bones that wrap the chest.
     - 1a. *True*: (7) attach to _____ via cartilage.
     - 1b. *False*: (5) attach to sternum indirectly or _____ at all.
       - 1c. *Floating*: last 2 false ribs — ____ sternal attachment.
  2. **Sternum**: _____ bone.
     - 2a. Manubrium - 2b. Body - 2c. Xiphoid Process
       - ***M**ark the **B**ody with an **X**.*
  3. **Intercostal cartilage**: connects ribs 1-10 to sternum.
     - _____ & _____.

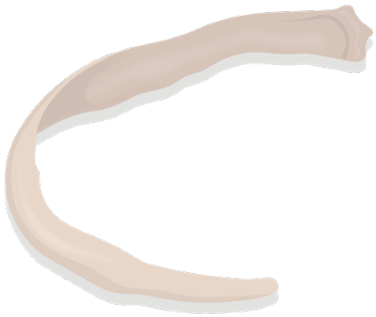


EXAMPLE: The image below shows two ribs. One is rib 10, while the other is rib 11. How can you tell which is which?



Rib #_____

Reasoning: _____



Rib #_____

Reasoning: _____

PRACTICE: When giving chest compressions during CPR the thoracic cavity can flex in and out without breaking bones. What is one reason that the thoracic cage is able to flex in this manner?

a) Flexible costal cartilage comprises a large portion of the anterior thoracic cage.

b) Ribs have a curved shape allowing them to flex and bend easily.

c) The floating ribs have no connection to the sternum allowing the thoracic cage to change shape easily.

d) The sternum is made of three bones that can easily bend where they form joints with each other.

TOPIC: THE THORACIC CAGE

PRACTICE: What makes false ribs different from true ribs?

a) False ribs do not articulate with the costal cartilage.

b) The costal cartilage that connects to true ribs connects directly to the sternum.

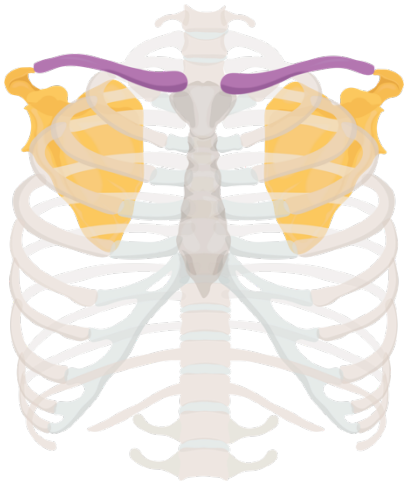
c) The true ribs articulate with the sternum, while false ribs do not.

d) False ribs articulate with costal cartilage but are not connected to the sternum.

TOPIC: THE PECTORAL GIRDLE

- **Pectoral Girdle** (_____ girdle): attaches arms to _____ skeleton.
  - Part of _____ skeleton.
- 2 bones:

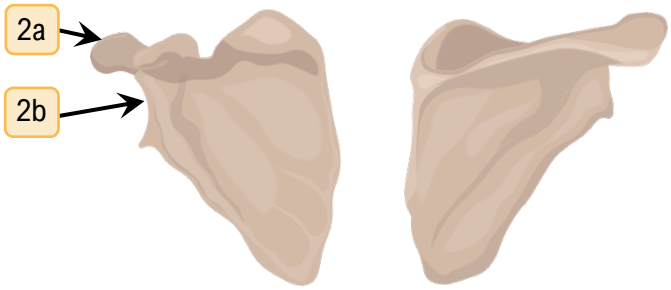
1. **Clavicle**: "_____ bones".
   - Articulates with sternum and scapula.



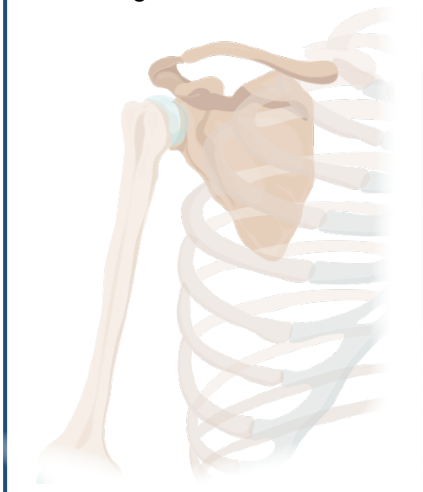
2. **Scapula**: "_____ blades".
   - Articulates with clavicle and humerus.

2a. **Acromion Process**: process where scapula meets clavicle.

2b. **Glenoid Cavity**: depression for the _____ - *shoulder socket.*



EXAMPLE: The shoulder joint is the most mobile joint in the body. Relate structures of the pectoral girdle that aid in making the shoulder so mobile.



Glenoid cavity: _____

Scapula: _____

Clavicle: _____

PRACTICE: The medial end of the clavicle articulates with what structure?

a) Scapula.
b) Humerus.
c) Ribs.
d) Sternum.

TOPIC: THE PECTORAL GIRDLE

PRACTICE: Which statement about the scapula is correct?

a) The scapula articulates with the ribs and the clavicle.

b) The acromion process is the most medial point of the scapula where it articulates with the clavicle.

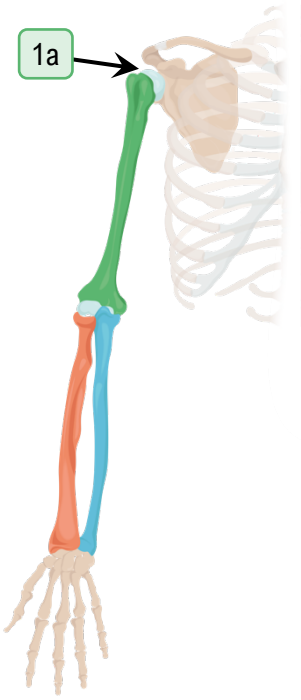
c) The scapula is the largest bone of the axial skeleton.

d) The glenoid cavity of the scapula articulates with the humerus.

TOPIC: BONES OF THE UPPER LIMB

Overview of the Arm and Forearm

- Arm:
  1. **Humerus**: _____ bone of the upper limb.
     1a. **Head**: _____ part, fits into the shoulder.



- Forearm:
  1. **Radius**: _____to the Ulna.
     - Same side as the _____.
     - Circular head articulates with humerus. *Circles have a radius.*
       - Allows you to turn your _____.
  2. **Ulna**: _____ to the Radius.
     - Makes a ____ in sagittal view. *Ulna makes a "U".*
     - Makes a _____ with the humerus.

PRACTICE: Of the two bones in the forearm, which bone is medial?

a) Humerus.
b) Radius.
c) Ulna.
d) Clavicle.

PRACTICE: When a person falls, a common reaction is to try to catch themselves by sticking out their hands. This will sometimes lead to a fracture in one or both of the bones of the forearm. Because one forearm bone is larger where it articulates with the wrist, this bone tends to absorb more force from the impact and is broken more often, making it the most commonly broken bone in the body. Where would such a break likely occur?

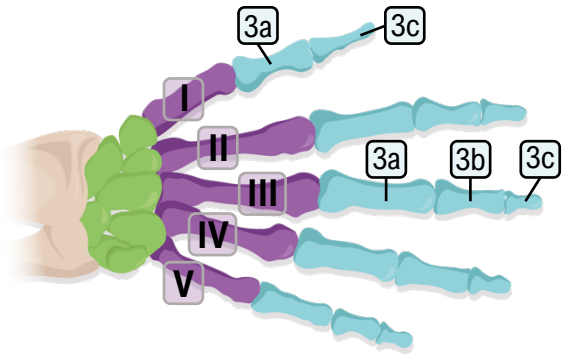
a) The distal end of the ulna.
b) The proximal end of the ulna.
c) The distal end of the radius.
d) The proximal end of the radius.

TOPIC: BONES OF THE UPPER LIMB

Overview of the Wrist and Hand

- Wrist and hand are made of _____ sets of bones.

1. **Carpals**: 8 _____ bones of the wrist.



2. **Metacarpals**: long bones of the palm.
   - Distal epiphyses form the _____.
   - Numbered 1: _____ through 5: pinky.

3. **Phalanges**: 14 tiny _____ bones.
   - Each finger has a:
     - Proximal phalanx (a)
     - _____ phalanx (b)
     - Distal phalanx (c)
   - Thumb only has _____.
     - _____ and _____.

EXAMPLE: Shravya is recently engaged and showing off her ring. Draw an "X" on the diagram below of where the ring would be placed. What is the name of the bone the ring surrounds?

_____

TOPIC: BONES OF THE UPPER LIMB

PRACTICE: Arrange the bones of the upper limb from proximal to distal. Some bones may not be included.

a) Humerus → Radius & Ulna → Metacarpals → Phalanges

b) Humerus → Ulna → Phalanges → Metacarpals → Carpals

c) Humerus → Radius → Ulna → Phalanges

d) Scapula → Ulna & Radius → Humerus → Phalanges

PRACTICE: Often people will "crack" their knuckle by pulling on their pointer finger. The cracking sound comes from knuckle where the finger meets the hand. What's another way to describe this location?

a) Between the first proximal phalanx and the first metacarpal.

b) Between the first and second phalanges of the proximal digit.

c) Between the second proximal phalanx and the second metacarpal.

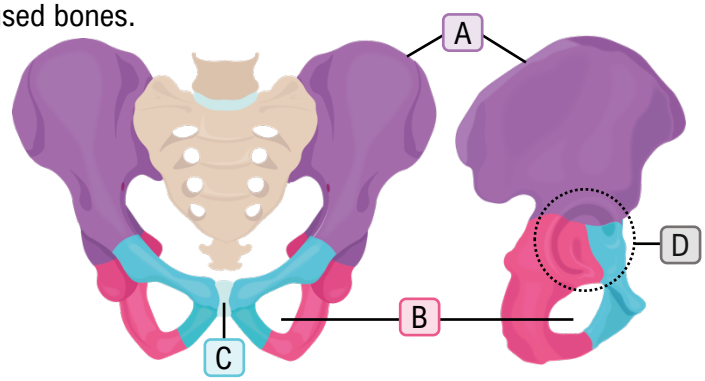
d) Between proximal and middle phalanges of the second digit.

TOPIC: THE PELVIC GIRDLE

- **Pelvic girdle:** made of R & L coxal bones. **Pelvis** = coxal bones + _____.
- **Coxal bone** (_____ _____) formed from _____ fused bones.

1. **Ilium**: Superior _____ region.
   - **Iliac crest** (A): your hips.
     - *"I like your iliac crest" = nice.*

2. **Ischium**: lower _____ region.
   - Forms **Obturator Foramen** (B) with pubis.
     - large hole in coxal bone.
   - Bones you sit on — _____ bones.
     - *Round**ISH** ischium is in your rear.*



3. **Pubis**: lower _____ region.
   - **Pubic symphysis** (C): _____ between R&L pubis.
     - *The pubis is pointy.*

Acetabulum (D): hip _____; formed by all 3 bones.
- With pubis pointing front, acetabulum is to the _____.

EXAMPLE: On the diagram below, label the three smaller bones that make up the coxal bone and identify whether the left or right coxal bone is shown.

Right or Left: _____

PRACTICE: On which bone is the acetabulum found?

a) Ilium.
b) Ischium.
c) Pubis.
d) A-C are all correct.

TOPIC: THE PELVIC GIRDLE

PRACTICE: When comparing the pelvic and pectoral girdles, which statement is *incorrect*?

a) The articulation between the pectoral girdle and the axial skeleton is smaller than the articulation between the pelvic girdle and the axial skeleton.

b) The socket of the hip joint is much deeper than the socket of the shoulder joint.

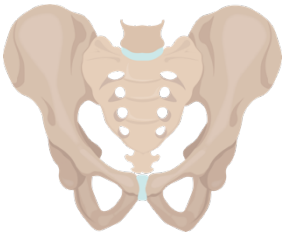
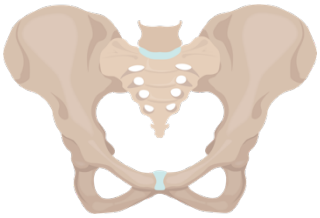
c) There are more individual bones in the pectoral girdle than the pelvic girdle.

d) The pelvic girdle allows for a greater range of motion than the pectoral girdle.

TOPIC: THE PELVIC GIRDLE

Differences Between the Male and Female Pelvis

- The _____ of the pelvis differs between males and females.

	Male		Female	
General Appearance	Narrow & _____.		_____ & lighter.	
Angle of Pubic Arch	_____		_____	
Shape of Pelvic Inlet	_____ & closer together.		_____ & further apart.	

- Female pelvis adapted for _____.

EXAMPLE: Below, four pelvises are shown. Two are shown from the front and two are shown from above. In each view, one pelvis is from a female and one is from a male. Identify which pelvises you believe to be male and which you believe to be female. Then, indicate at least one anatomical feature that allowed you to differentiate the two by marking it on the picture.

Likely sex:

_____ _____ _____ _____

PRACTICE: How does the angle of the pelvic arches differ in male and female pelvises?

a) The angle of the male pelvic arch tends to be more acute than the female pelvic arch.

b) A female's pelvic arch tends to be rounder to accommodate the head of the baby.

c) The female pelvic arch tends to be more heart shaped than the male pelvic arch.

d) The pelvic arch is not a reliable indicator of sex.

TOPIC: BONES OF THE LOWER LIMB

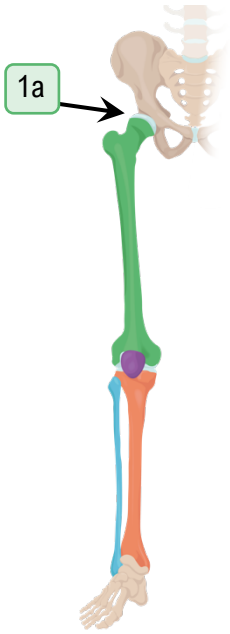
Bones of the Thigh and Leg

1. **Femur:** _____ & largest long bone.
   1a. **Head**: round _____ that fits into the acetabulum.

2. **Patella:** _____ bone — _____ _____.

3. **Tibia**: larger, _____ bone.
   - Contributes to the _____ joint.

4. **Fibula**: _____, more lateral bone.
   - ***T**ibia is **T**ough: **F**ibula is **F**ine*.



EXAMPLE: You forgot your shin guards at soccer practice and managed to get kicked in the shin, inner ankle, and outer ankle. Which bone is getting kicked in each scenario?

Shin: _____

Inner Ankle: _____

Outer Ankle: _____

PRACTICE: With which bones does the femur articulate?

a) The tibia, the fibula, the coxal bone, and the patella.
b) The tibia, the coxal bone, and the patella.
c) The tibia, and the coxal bone.
d) The tibia, the fibula, and the coxal bone.

TOPIC: BONES OF THE LOWER LIMB

PRACTICE: The structure of the upper limbs (the arms) and the lower limbs (the legs) follow a similar pattern. Which of the following statements comparing the limbs is *not* accurate?

a) Between the girdle and the wrist/ankle, the lower limbs have more bones.

b) The radius and ulna bear weight roughly equally, where the tibia bears much more weight than the fibula.

c) The humerus articulates with both bones of the forearm at the elbow, while the femur only articulates with one bone of the lower leg.

d) The radius and ulna have less mobility between them than the tibia and fibula.

TOPIC: BONES OF THE LOWER LIMB

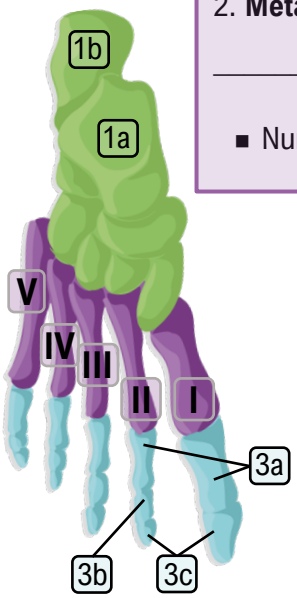
Bones of the Foot

- Foot and ankle are made up of 3 sections of bones—like the _____.

1. **Tarsals**: ____ short bones of the ankle.
   1a. _____: top of ankle.
   - ***T**alus **T**op of the **T**arsals.*
   1b. Calcaneus: _____ bone.

2. **Metatarsals**: long bones that create the _____ of the foot with the tarsals.
   - Numbered 1: medial, through 5: lateral.

3. **Phalanges**: ~14 tiny _____ bones.
   - Singular _____: *Greek battle formation*.
   - Each toe has:
     - Proximal 3a, Middle 3b, Distal 3c.
   - _____ toe only has proximal and distal.



EXAMPLE: If you have five toes and proximal, middle, and distal phalanges; 5 x 3 = 15. Why do you only have 14 phalanges?

_____

_____

PRACTICE: How do the metatarsals contribute to the foot's ability to bear weight?

a) Their irregular shape helps them distribute the weight of the body.

b) The seven bones distribute the weight, so each bone only withstands a fraction of the total body weight.

c) The bones have additional collagen to help them resist force and twisting.

d) The bones help create arches that distribute the weight.

TOPIC: BONES OF THE LOWER LIMB

PRACTICE: Distinguish between the Talus and the Calcaneus.

a) The talus is considered one of the tarsals; the calcaneus is not.

b) The talus articulates with the tibia; the calcaneus only articulates with other tarsals.

c) The calcaneus is the heel bone; the talus makes up the parts of your ankle bones that you can feel.

d) The calcaneus is the largest tarsal; the talus is the smallest tarsal.