Answer Key: Brain Lab

Activity 1: Brain Lab

1. Launch the view!
   • Launch Human Anatomy Atlas.
   • Navigate to Quizzes/Lab Activities, find the Brain Lab section.
   • ⚛ Launch Augmented Reality mode and scan the image below.
   • Don’t have AR? Select view 1. Brain.

2. Label the image.
   • Explore the 3D model of the brain to locate the anatomy in the structure list.
   • Use the structure list to label the image.

Postcentral gyrus/somatosensory cortex
Parietal lobe
Occipital lobe
Cerebellum
Precentral gyrus/primary motor cortex
Frontal lobe
Temporal lobe

The cerebral cortex, the outer layer of the cerebrum, has a left and a right hemisphere. Each hemisphere has four lobes that specialize in various areas of thought and memory, planning and decision making, and speech and sense perception.

Structure list:
1. Cerebellum
2. Frontal lobe
3. Occipital lobe
4. Parietal lobe
5. Postcentral gyrus/somatosensory cortex
6. Precentral gyrus/primary motor cortex
7. Temporal lobe
Activity 2: Brain Lab

1. Launch the view!
   - Launch Human Anatomy Atlas.
   - Navigate to Quizzes/Lab Activities, find the Brain Lab section.
   - ![Launch Augmented Reality mode and scan the image below.](image)
     - Don’t have AR? Select view 1. Brain.

2. Fill in the blanks.
   - Find the structures listed in the word bank.
   - Read the definitions, then fill in the blank with the correct brain structure from the word bank.
Word bank:
- Brain stem
- Cerebrum
- Cerebellum
- Diencephalon
- Medulla oblongata
- Pituitary gland
- Pons

The ____brain stem____ connects the spinal cord to the higher-thinking centers of the brain. It consists of the medulla oblongata, pons, and midbrain.

The ____cerebrum____ is the largest part of the brain and allows the body to consciously control its actions. It’s divided into two hemispheres, each with four lobes.

The ____pituitary gland____ is a small endocrine gland that secretes and stores hormones that manage endocrine system functions. It’s attached to the end of the infundibulum of the hypothalamus and has two lobes.

The ____medulla oblongata____ acts as the conduction pathway between the brain and spinal cord. It contains nuclei that regulate autonomic functions, such as respiration and heartbeat.

The ____cerebellum____ fine tunes the movements of the body and manages balance and posture.

The ____pons____ bridges the two main function areas of the central nervous system and forms part of the brain stem. It’s continuous with the medulla oblongata.

The ____diencephalon____ is a region of the forebrain with three distinct structures, the thalamus, hypothalamus, and epithalamus. These structures contribute to learning and memory, the regulation of autonomic nervous system functions, emotions and behavior, food consumption, and body temperature and circadian rhythms.
1. **Launch the view!**
- Launch Human Anatomy Atlas.
- Navigate to Quizzes/Lab Activities, find the Brain Lab section.
- ![Launch Augmented Reality mode and scan the image below.](image)
- Don’t have AR? Select **view 2. Limbic System**.

2. **Label the image.**
- Explore the 3D model of the brain to locate the anatomy in the structure list.
- Use the structure list to label the image.

The limbic system includes several structures, located above the diencephalon, that create a functional classification of the brain. Limbic structures are associated with emotions, the sense of smell, and memory.

**Structure list:**
1. Amygdala
2. Cingulate gyrus
3. Hippocampus
4. Indusium griseum
1. Launch the view!
   • Launch Human Anatomy Atlas.
   • Navigate to Quizzes/Lab Activities, find the Digestive Lab section.
   • 📡 Launch Augmented Reality mode and scan the image below.
   • Don’t have AR? Select view 1. Digestive System.

2. Fill in the blanks.
   • Find the structures listed in the word bank.
   • Read the definitions, then fill in the blank with the correct digestive system structure from the word bank.
The ____alimentary canal____ is a single, continuous tube that includes the oral cavity, esophagus, stomach, and intestines.

The ____oral cavity____ contains the teeth, tongue, and hard and soft palates. Food, also known as the bolus, passing through here is chewed by the teeth and partially digested by saliva.

The ____salivary glands____ secrete saliva to aid in chewing and swallowing of the bolus, beginning chemical digestion.

The ____tongue____ works with the teeth to break down food into small masses that can be swallowed.

The ____epiglottis____ prevents choking by folding down to close off the larynx and trachea, directing the bolus into the esophagus.

The ____esophagus____ is a long, hollow, muscular tube that extends from the pharynx to the stomach. It’s the pathway for the bolus to enter the stomach.

The ____stomach____ has four regions and three layers, provides food storage, and breaks down ingested food into chyme.

The ____small intestine____ has three regions, the duodenum, jejunum, and ileum.
The **large intestine** is composed of the colon, cecum, appendix, rectum, and anal canal. The final phases of digestion, absorption, and elimination occur here.

The **rectum** is the final segment of the large intestine and serves primarily to store and expel solid waste. It’s a tube that’s approximately 12 cm long.

The **anal canal** is located at the inferior end of the rectum and extends to the anus. It’s the termination point or end of the alimentary canal. It temporarily stores solid waste that’s ready to be eliminated from the body.
Activity 2: Digestive Lab

1. Launch the view!
   • Launch Human Anatomy Atlas.
   • Navigate to Quizzes/Lab Activities, find the Digestive Lab section.
   • ![Launch Augmented Reality mode and scan the image below.](image)
   • Don’t have AR? Select view 2. Accessory Organs.

2. Label the image.
   • Explore the 3D model of the accessory organs to locate the anatomy in the structure list.
   • Use the structure list to label the image.

Structure list:
1. Common bile duct
2. Common hepatic duct
3. Cystic duct
4. Gall bladder
5. Liver, left lobe
6. Liver, right lobe
7. Pancreas
Activity 3: Digestive Lab

1. Review how food travels through the digestive system.
   - Read the articles here: https://www.visiblebody.com/learn/digestive.
   - Number the following statements, from 1 to 10, to accurately show the path food takes through the digestive system.

6. Gastric juices, produced in the gastric gland and containing hydrochloric acid and enzymes, digest food into chyme.

10. Solid waste is temporarily stored in the rectum before it is passed through the anal canal.

3. The tongue rises to the roof of the mouth, directing the bolus out of the oral cavity.

1. Food is consumed and taken into the oral cavity.

7. Pancreatic juice enters the duodenum through the pancreatic ducts to aid digestion in the small intestine.

4. The bolus passes from the oral cavity to the pharynx and into the esophagus.

8. Chyme travels through the small intestine, where nutrients are absorbed into the bloodstream.

2. Food is broken down into a small mass called the bolus by being chewed and mixed with saliva that is secreted by the salivary glands.

9. Chyme travels through the large intestine, where water and specific vitamins are absorbed and the remaining waste materials pass to the rectum.

5. Peristaltic waves move the bolus down the esophagus into the stomach.
Activity 4: Digestive Lab

1. Launch the view!
   - Launch Human Anatomy Atlas.
   - Navigate to Quizzes/Lab Activities, find the Digestive Lab section
   - Launch Augmented Reality mode and scan the image below.
   - Don’t have AR? Select view 3. Tongue Surface.

Find the following structures of the tongue.

Papillae are elevations on the tongue, some of which contain taste buds. In the 3D model, find the **vallate papillae**: Each contains 100-300 taste buds. **Fungiform papillae** are shaped like mushrooms: Each contains about 5 taste buds.
**Answer Key: Anatomy of the Eye and Ear Lab**

**Activity 1: Anatomy of the Eye and Ear Lab**

1. **Launch the view!**
   - Launch Human Anatomy Atlas.
   - Navigate to Quizzes/Lab Activities, find the Eye and Ear Lab section.
   - ![Launch Augmented Reality mode and scan the image below.](image)
   - Don’t have AR? Select **view 1. Eye**.

2. **Explore the eye.**
   - Find each structure in the word bank, study its location, read the definition, and listen to the pronunciation.
   - In the table, list each structure from the word bank under the correct layer of the eye.
**Word bank:**

- Choroid
- Ciliary body
- Cone cells
- Cornea
- Iris
- Retina
- Rod cells
- Sclera

<table>
<thead>
<tr>
<th>Fibrous Layer</th>
<th>Vascular Layer</th>
<th>Inner Layer</th>
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</thead>
<tbody>
<tr>
<td>• Sclera</td>
<td>• Choroid</td>
<td>• Retina</td>
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<tr>
<td>• Cornea</td>
<td>• Ciliary body</td>
<td>• Rod cells</td>
</tr>
<tr>
<td></td>
<td>• Iris</td>
<td>• Cone cells</td>
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</tbody>
</table>
Activity 2: Anatomy of the Eye and Ear Lab

1. Launch the view!
   - Launch Human Anatomy Atlas.
   - Navigate to Quizzes/Lab Activities, find the Eye and Ear Lab section.
   - ![Launch Augmented Reality mode and scan the image below.]()  
   - Don’t have AR? Select view 1. Eye.

2. Find the key structures of the eye.
   - Read the definition of the structures listed in the word bank.
   - In the table, list each structure from the word bank under the function it performs.
**Word bank:**
- Choroid
- Ciliary body
- Cornea
- Eyelid
- Inferior oblique
- Inferior rectus
- Iris
- Lacrimal gland
- Lacrimal sac
- Lateral rectus
- Lens
- Medial rectus
- Optic nerve
- Retina
- Sclera
- Superior rectus

<table>
<thead>
<tr>
<th>Protection and Nutrition</th>
<th>Movement</th>
<th>Accommodating Light</th>
<th>Nerve Impulse Transmission</th>
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<tbody>
<tr>
<td>• Choroid • Eyelid • Lacrimal gland • Lacrimal sac • Sclera</td>
<td>• Inferior oblique • Inferior rectus • Lateral rectus • Medial rectus • Superior rectus</td>
<td>• Ciliary body • Cornea • Iris • Lens</td>
<td>• Optic nerve • Retina</td>
</tr>
</tbody>
</table>
Activity 3: Anatomy of the Eye and Ear Lab

1. Launch the view!
   • Launch Human Anatomy Atlas.
   • Navigate to Quizzes/Lab Activities, find the Eye and Ear Lab section.
   • Launch Augmented Reality mode and scan the image below.
   • Don’t have AR? Select view 1. Ear.

2. Label the image.
   • Explore the 3D model of the inner ear to locate the anatomy in the structure list.
   • Use the structure list to label the image.

Structure list:

1. CN 08 (VIII) Vestibulocochlear
2. CN 08 (VIII) Cochlear
3. Cochlea
4. Incus
5. Malleus
6. Semicircular canals
7. Stapes
8. Tympanic membrane
9. Vestibule
**Activity 4: Anatomy of the Eye and Ear Lab**

1. **Launch the view!**
   - Launch Human Anatomy Atlas.
   - Navigate to Quizzes/Lab Activities, find the Eye and Ear Lab section.
   - ![Launch Augmented Reality mode and scan the image below.](image)
   - Don’t have AR? Select **view 2. Ear**.

2. **Fill in the blanks.**
   - Find the structures listed in the word bank.
   - Read the definitions, then fill in the blanks with the correct ear structures from the word bank.
Word bank:
- Auricle
- Cochlea
- External acoustic meatus
- Incus
- Inner ear
- Malleus
- Middle ear
- Outer ear
- Oval window
- Semicircular canals
- Stapes
- Tympanic membrane
- Vestibule

The ____stapes____, known as the “stirrup,” is one of the auditory ossicles of the middle ear. It plays a key role, with the malleus and incus, in transferring vibrations from the tympanic membrane to the oval window to facilitate hearing.

The ____outer ear____ funnels sound waves. It consists of the auricle and the external acoustic meatus. It is the outermost section of the ear.

The ____cochlea____ is a spiral-shaped structure of the inner ear that looks like a shell. When it receives movement from the three auditory ossicles, fluid inside it moves. These fluid waves move hair cells, which activates nervous system receptors. Signals travel to the brain, where they are interpreted as sound.

The ____external acoustic meatus____ is a passageway from the bottom of the concha to the tympanic membrane. It forms an S-shaped curve.

The ____inner ear____ contains fluid-filled canals that contribute to hearing and balance. It’s the innermost part of the ear and contains two types of labyrinths: A bony labyrinth with a series of cavities, including the semicircular canals and the vestibule, and a membranous labyrinth.

The ____middle ear____ contains three auditory ossicles, the malleus, incus, and stapes.

The ____malleus____, known as the “hammer,” is one of the auditory ossicles of the middle ear. It plays a key role in transferring vibrations from the tympanic membrane to the incus to facilitate hearing.
The ____auricle____ is composed of a curved helix and an inferior part called the lobule.

____Semicircular canals____ provide sensory input for equilibrium. There are three of these in the inner ear: superior, posterior, and lateral. Each of these has an expansion at one end, called the ampulla, which contains fluid known as endolymph. As the head rotates or moves, the movement of the endolymph causes hair cells to bend, generating nerve impulses.

The ____incus____, known as the “anvil,” is one of the auditory ossicles of the middle ear. It plays a key role, with the malleus, in transferring vibrations from the tympanic membrane to the stapes to facilitate hearing.

The ____tympanic membrane____, also known as the ear drum, is a thin, nearly oval membrane. When sound waves strike this structure, it creates vibrations that travel to the bones of the middle ear to facilitate hearing.

The ____vestibule____ is the central part of the bony labyrinth of the inner ear.

The ____oval window____ is an opening that leads from the middle ear to the vestibule of the inner ear. Vibrations, transferred from bone to bone in the middle ear, hit this membrane, causing it to vibrate and build pressure waves in the cochlea. This begins a process that generates nerve impulses.
Activity 1: Pulmonary Circulation Lab

1. Launch the view!
   - Launch Human Anatomy Atlas.
   - Navigate to Quizzes/Lab Activities, find the Pulmonary Circulation Lab section.
   - ![Launch Augmented Reality mode and scan the image below.]
   - Don’t have AR? Select view 1. Heart Section.

2. Label the image.
   - Explore the 3D model of the heart to locate the anatomy in the structure list.
   - Use the structure list to label the image.

Structure list:

1. Aortic valve
2. Left atrium
3. Left ventricle
4. Mitral valve
5. Pulmonary valve
6. Right atrium
7. Right ventricle
8. Tricuspid valve
Activity 2: Pulmonary Circulation Lab

1. Launch the view!
   - Launch Human Anatomy Atlas.
   - Navigate to Quizzes/Lab Activities, find the Pulmonary Circulation Lab section.
   - ![Launch Augmented Reality mode and scan the image below.](image)
   - Don’t have AR? Select view 2. Pulmonary Circulation.

2. Explore the anatomy related to pulmonary circulation.
   - Find the structures in the word bank. Be sure to select the book icon to read each definition.
   - Using this information, organize the structures in the word bank into two groups: Structures that carry deoxygenated blood and structures that carry oxygenated blood.
Word bank:
- Aorta
- Aortic valve
- Left atrium
- Left ventricle
- Mitral valve
- Pulmonary arteries
- Pulmonary valve
- Pulmonary veins
- Right atrium
- Right ventricle
- Tricuspid valve
- Vena cava

<table>
<thead>
<tr>
<th>Deoxygenated Blood</th>
<th>Oxygenated Blood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vena cava</td>
<td>Aorta</td>
</tr>
<tr>
<td>Right ventricle</td>
<td>Pulmonary veins</td>
</tr>
<tr>
<td>Tricuspid valve</td>
<td>Left atrium</td>
</tr>
<tr>
<td>Right atrium</td>
<td>Left ventricle</td>
</tr>
<tr>
<td>Pulmonary valve</td>
<td>Mitral valve</td>
</tr>
<tr>
<td>Pulmonary arteries</td>
<td>Aortic valve</td>
</tr>
</tbody>
</table>
Activity 3: Pulmonary Circulation Lab

1. Launch the view!
   - Launch Human Anatomy Atlas.
   - Navigate to Quizzes/Lab Activities, find the Pulmonary Circulation Lab section.
   - Launch Augmented Reality mode and scan the image below.
   - Don’t have AR? Select view 2. Pulmonary Circulation.

2. Explore the model.
   - Using the information you find on these structures, reorganize the list below so it correctly follows the path of deoxygenated blood into the heart and out to the lungs.

   Right atrium > pulmonary valve > superior or inferior vena cava > right ventricle > lungs > tricuspid valve > pulmonary arteries

   Superior or Inferior Vena Cava > right atrium > tricuspid valve > right ventricle > pulmonary valve > pulmonary arteries > lungs
Activity 4: Pulmonary Circulation Lab

1. Launch the view!
   - Launch Human Anatomy Atlas.
   - Navigate to Quizzes/Lab Activities, find the Pulmonary Circulation Lab section.
   - ![Launch Augmented Reality mode and scan the image below.](image)
   - Don’t have AR? Select **view 2. Pulmonary Circulation**.

2. Explore the model.
   - Using the information you find on these structures, reorganize the list below so it correctly follows the path of **oxygenated** blood into the heart and out to the lungs.

   Pulmonary veins > left atrium > left ventricle > aortic valve > aorta > lungs > body

   Lungs > pulmonary veins > left atrium > left ventricle > aortic valve > aorta > body
**Answer Key: Respiratory Lab**

**Activity 1: Respiratory System Lab**

1. **Launch the view!**
   - Launch Human Anatomy Atlas.
   - Navigate to Quizzes/Lab Activities, find the Respiratory Lab section.
   - ![Launch Augmented Reality mode and scan the image below.](image)
   - Don’t have AR? Select **view 1. Respiratory System**.

2. **Fill in the blanks.**
   - Find the structures listed in the word bank.
   - Read the definitions, then fill in the blank with the correct respiratory system structure from the word bank.
The **nasal cavity** is composed of the chambers of the internal nose that function as a part of the upper respiratory system.

The **laryngopharynx** is the most posterior part of the pharynx. It is shared by the respiratory system and the digestive system. The upper respiratory and upper digestive tracts diverge right after this structure. The front of this structure merges with the triangular entrance of the larynx.

The **trachea** conveys air between the upper and lower respiratory structures.

The **nasopharynx** is a portion of the pharynx that begins at the rear of the nasal cavity and functions as an airway in the upper respiratory system. Its cavity always stays open, unlike the other parts of the pharynx.

The **lungs** are two organs that are responsible for gas exchange.

The **bronchi** are the major airways of the lower respiratory system.

The **alveoli** are the main sites of gas exchange, where oxygen is brought into the bloodstream and carbon dioxide is removed.

The **oropharynx** is a portion of the pharynx that is shared by the respiratory system and the digestive system. It functions as an airway in the upper respiratory system.

The **primary bronchi** are the major airways of the lower respiratory system. They link the trachea with the right and left lungs. They are wrapped in rings of hyaline cartilage, and their interiors are lined with mucous membrane.
Activity 2: Respiratory System Lab

1. Launch the view!
   • Launch Human Anatomy Atlas.
   • Navigate to Quizzes/Lab Activities, find the Respiratory Lab section.
   • Launch Augmented Reality mode and scan the image below.
   • Don’t have AR? Select view 1. Respiratory System.

2. Label the image.
   • Explore the 3D model of the respiratory system to locate the anatomy in the structure list.
   • Use the structure list to label the image.

Structure list:
1. Diaphragm
2. Laryngopharynx
3. Lungs
4. Oropharynx
5. Nasal cavity
6. Nasopharynx
7. Primary bronchus
8. Trachea
1. **Learn about respiration!**

- Read the articles on the respiratory system: [https://www.visiblebody.com/learn/respiratory](https://www.visiblebody.com/learn/respiratory).
- Fill in the blanks in the following statements.

In **pulmonary ventilation**, air is inhaled through the nasal and oral cavities (the nose and mouth). Air moves through the pharynx, larynx, and trachea into the lungs. Then, it is exhaled, flowing back through the same pathway.

Inside the lungs, oxygen is exchanged for carbon dioxide waste through the process called **external respiration**. This respiratory process takes place through hundreds of millions of microscopic sacs called **alveoli**.

The bloodstream delivers oxygen to cells and removes waste carbon dioxide through **internal respiration**.
Activity 4: Respiratory System Lab

1. Launch the view!
   - Launch Human Anatomy Atlas.
   - Navigate to Quizzes/Lab Activities, find the Respiratory Lab section.
   - ![Launch Augmented Reality mode and scan the image below.](image)
   - Don’t have AR? Select view 2. Alveolar Sacs.

2. Label the image.
   - Explore the 3D model of the alveolar sacs to locate the anatomy in the structure list.
   - Use the structure list to label the image.

Alveoli are microscopic air sacs that are home to the main function of the respiratory system: carrying out gas exchange to bring oxygen into the body and remove carbon dioxide.

Structure list:

1. Alveolus
2. Alveolar cavities
3. Bronchiolar smooth muscle
4. Pulmonary artery
5. Pulmonary capillary beds
6. Pulmonary vein
7. Respiratory bronchiole
8. Terminal bronchiole
Skull Bones Lab: Answer Key

Activity 1: Skull Bones Lab

1. Launch the view!
   • Launch Human Anatomy Atlas.
   • Navigate to Quizzes/Lab Activities, find the Skull Bones Lab section.
   • Launch Augmented Reality mode and scan the image below.
   • Don’t have AR? Select view 1. Skull.

2. Explore the skull bones.
   • Select the structures, read their definitions, and study the hierarchy breadcrumb trail.
   • In the table, use this information to classify the skull bones in the word bank as either facial bones or braincase bones.
### Word bank:
- Ethmoid bone
- Frontal bone
- Inferior nasal conchae
- Lacrimal bone
- Mandible
- Maxillae
- Nasal bone
- Occipital bone
- Palatine bone
- Parietal bone
- Sphenoid bone
- Temporal bone
- Vomer
- Zygomatic bone

<table>
<thead>
<tr>
<th>Facial Bones</th>
<th>Braincase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vomer</td>
<td>Frontal bone</td>
</tr>
<tr>
<td>Mandible</td>
<td>Parietal bone</td>
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<tr>
<td>Inferior nasal conchae</td>
<td>Occipital bone</td>
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<tr>
<td>Nasal bone</td>
<td>Temporal bone</td>
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<td>Maxillae</td>
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<td>Lacrimal bone</td>
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Activity 2: Skull Bones Lab

1. Launch the view!
   • Launch Human Anatomy Atlas.
   • Navigate to Quizzes/Lab Activities, find the Skull Bones Lab section.
   • Launch Augmented Reality mode and scan the image below.
   • Don’t have AR? Select view 1. Skull.

2. Label the image.
   • Explore the 3D model of the skull to locate the anatomy in the structure list.
   • Use the structure list to label the image.

Structure list:
1. Inferior nasal concha
2. Lacrimal
3. Mandible
4. Nasal
5. Vomer
6. Zygomatic
1. Launch the view!
- Launch Human Anatomy Atlas.
- Navigate to Quizzes/Lab Activities, find the Skull Bones Lab section.
  - ![Launch Augmented Reality mode and scan the image below.](image)
  - Don’t have AR? Select **view 2. Braincase**.

2. Label the image.
- Explore the 3D model of the braincase to locate the anatomy in the structure list.
- Use the structure list to label the image.

**Structure list:**
- 1. Ethmoid
- 2. Frontal
- 3. Occipital
- 4. Parietal
- 5. Sphenoid
- 6. Temporal
Activity 4: Skull Bones Lab

1. Launch the view!
   • Launch Human Anatomy Atlas.
   • Navigate to Quizzes/Lab Activities, find the Skull Bones Lab section.
   • Launch Augmented Reality mode and scan the image below.
   • Don’t have AR? Select view 3. Bones of the Orbit.

2. Label the image.
   • The orbits are the cavities in the skull that protect the eyes.
   • Explore the 3D model of the skull to locate the anatomy in the structure list.
   • Use the structure list to label the image.

Structure list:
1. Ethmoid  
2. Frontal  
3. Lacrimal  
4. Maxilla  
5. Sphenoid  
6. Zygomatic
Activity 5: Skull Bones Lab

1. Launch the view!
   • Launch Human Anatomy Atlas.
   • Navigate to Quizzes/Lab Activities, find the Skull Bones Lab section.
   • ![Launch Augmented Reality mode and scan the image below.](image)
   • Don’t have AR? Select **view 4. Disarticulated Skull.**

2. Explore the animated skull.
   • Note that this is an animated skull model.
   • Observe how the bones fit together.