Have someone in your group read the following out loud, while the others read along:

In this "Lab Exercise Guide", we will be looking at the important features found in the skull. You should use these sections in your lecture book:

Axial Skeleton Chapter: The Skull (articulated only!)
Axial Skeleton Chapter: Fetal Skull

When we study the skull, we will only be looking at an articulated skull. Three are some exceptions:

1. The top of the skull has been cut, so you can remove the cap and look into the skull. Notice that there is a latch that keeps the skull cap on! See this image:

   ![Image of skull with latch and transverse section](image)

   - **latch**
   - **transverse section**
   - **remove cap**
   - **rotate to see in**

   Pick up the skull on our table. Unlatch the hook, and remove the cap. Take a look inside the skull.

2. The jaw bone (mandible) comes off. It may be removed during an exam.

   Pick up the skull and lower the jaw. Notice the articulation with the skull itself.
3. There is a small bone in the neck called the hyoid bone (see later). This bone will not be articulated with the skull.

Be careful picking up the skull ... it is fragile. Always carry a skull from its base:

And remember to avoid using pencils or pens to point at structures. Instead, seek out the blunt-ended probes found in the lab room:

There is one or more COLORED SKULL(s) in lab. This is for reference ONLY ... in case you can't figure out where a bone is! Your exam will only have "uncolored" skulls, like the ones at your desk.

*It will be best to do the Steps found in this "Lab Exercise Guide" in the order in which they appear!*
Step 1. Identify the sutures, and separate the facial from cranial bones (in your mind)

You may want to use your lecture book to help you!

Answer these questions after reading your book, or watching the videos. You will need a skull at your station. Use the images in your text or lab book for help.

Q 1. Using the drawing of sutures you made in the "Lab Exercise Guide" entitled What to know about the skull before coming to lab, find the sutures on the skull at your station.

Q 2. Using the image you labeled of the skull bones you made in the "Lab Exercise Guide" entitled What to know about the skull before coming to lab, find the sutures on the skull at your station.

Just as a reminder, the image looked like this:
Team Assessment for STEP 1

Before moving onto the next step, make sure everyone in your group gets at least a "75%" on this assessment. That means they have to get 7 - 8 out of 10 on the score-sheet below.

*If you move on before doing this assessment, you will only end up spending more time later! It is better to know the bones of the skull WELL before moving on to another part of the skeleton.*

Repeat this procedure in a couple of days...but before the next lab session. You will find that through this process you will do much less "cramming" for the quiz or exam. Instead...you will simply know the material!

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Using the diagram you labeled on the previous page as a key, quiz your teammates on the skull. Point at every bone, and ask "name this bone".

Only give them a few seconds to answer. If they haven't in 5 seconds, say "time's up!" and give them the answer. Then RE-ASK THE SAME BONE OR SUTURE in a few questions.

If they haven't gotten it correct the third time you return to a bone, make them write it out 5 times on a piece of paper. Then, ask them again later.

**HINT:** to make this challenge harder, ask for some of the bones on the base of the skull. Same bones, but a different perspective. Watch the sutures!

**Score Sheet:**

<table>
<thead>
<tr>
<th>How many did they get right?</th>
<th>Teammate #1</th>
<th>Teammate #2</th>
<th>Teammate #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Words they are struggling with:</td>
<td></td>
<td></td>
<td></td>
</tr>
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</table>

Percent Correct:
Step 2. Identify the features you need to know on the skull

Answer these questions after reading your book, or watching the videos. Different instructors have you know different features (processes, fossa and foramen) for each bone of the skull. Here, we will simply list them. If your instructor doesn't want any features of a bone listed, write "NONE". We have included, at the end, a space for you to add "specialty bones or features".

Q 3. Features on the outside of the skull.

DO NOT INCLUDE the small foramen at the base of the skull; we will do them separately!

Any feature that is made of more than 1 bone (for example, the zygomatic arch), put under "Other features I have to know"! Use a separate piece of paper if necessary.

Frontal bone -

Parietal bone -

Temporal bone -

Occipital bone -
Maxillary bone (Maxilla) -

Mandible -

Sphenoid bone -

Ethmoid bone -

Zygomatic bone -

Features from Specialty bones (hyoid, vomer, palatines, turbinates, auditory ossicles, etc) -

Other features I need to know off the skull -
Q 4. Find all of the features listed previously on a skull. Label them on as many images as you can. If you cannot label something because it is not easily seen, skip it and list it at the bottom:

List any features you couldn't label:
Q5. Which of the words that you labeled in the previous question can you palpate on your own skull? Try these:

- Zygomatic bone & arch
- Mastoid process
- Temporomandibular joint
- Angle of mandible

Q6. Features found within the cranial cavity:

Some instructors want you to know some features found on the inside of the skull. List them here, while labeling them on the diagram. Use a separate piece of paper if necessary. If the answer is “none”, write that in the blank:

- Frontal bone  -
- Parietal bone  -
- Temporal bone  -
- Occipital bone  -
- Sphenoid bone  -
- Ethmoid bone  -

NOTE: If you have time, now would be a good time to do the first activity in the “Additional Activities To Do” section found at the end!
Q7. **Foramen on the Base of the Skull:**

Some instructors want you to some or all of the foramen found on the base of the skull. List any you need to know here:

Now, label them on this image. LABEL THEM ON BOTH SIDES OF THE SKULL!
Step 3. Examining the Fetal Skull.

Do Only If a FETAL SKULL is available, and if your instructor asks you to:

This exercise may not be available; you should ask your instructor if your group needs to do this.

Q 8. Some instructors want you to some features of the fetal skull. List any you need to know here.

Q 9. Now, label them:
Step 4. Close look at the nasal region & palate

In the lab room is a model we call the "Big Nose model". See the image below. Bring it to your station. Make sure you have a skull at your station.

If possible, it might help to also have the following available, as you answer the questions below.

- Dissected skull (showing nasal cavities)
- Skull (real bone" with removable skull cap) with a frontal sinus

Not all this information will likely appear on the exam. However, if you understand the questions below, you will understand the skull better.

The "Big Nose model" is a sagittal section through the skull. On one side, you can see the nasal septum, which is the wall between the 2 sides of the nasal cavity. Find this structure on the "real bone skull" if you have one, or on a plastic skull.

**Q10.** Which bones comprise the nasal septum? Label them on the photo of the model.

**Q11.** The "perpendicular plate" belongs to which bone? Make sure it is labeled, also.
On the other side of the model, we see the nasal conchae. If we look above the superior concha on the "Big Nose model", we can see the crista galli. Take the skull cap off the skull at your station. Find these structures on the "real bone skull" if you have one, or a plastic skull.

**Q12.** The superior-most nasal concha and the crista galli belong to which bone? Label them on the photo.

On both sides of the model, we can see the hard palate, made of bone. The palate is made of 2 bones. Look at it on your skull, while finding the bones on the "Big Nose Model".

**Q13.** Name the 2 bones that comprise the hard palate. Label them on the photo.
Look at the image below showing you the "paranasal sinuses", while examining the "Big Nose model" and answering the questions below.

Q14. Label the sinuses on the drawing.

Q15. Find these sinuses on the "Big Nose model", labeling them on the previous page's photo:

   Frontal sinus
   Sphenoid sinus

Q16. Why is it hard (or impossible) to see these sinuses:

   Maxillary
   Ethmoid

   HINT: This is a sagittal section, so it is hard to see things that are 
   ______________ on the skull

Illustration by: Michal Komorniczak

Q17. If you have a real skull at your station, remove the skull cap. Can you see a frontal sinus? Label it on the photo below:
Team Assessment for STEP 2

Using a skull at your desk, quiz your teammates on the features of the skull. Point at every feature, and ask "name this bump", "name this hole", of "name this feature".

Make sure you ask all features seen in all the questions in this document. There have been several questions!

Only give them a few seconds to answer. If they haven't in 5 seconds, say "time's up!" and give them the answer. Then RE-ASK THE SAME FEATURE in a few questions.

If they haven't gotten it correct the third time you return to a bone, make them write it out 5 times on a piece of paper. Then, ask them again later.

Include the parts of the fetal skull if your instructor wants to!

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Additional Activities To Do

These are some helpful activities to do while in lab. These models will not be available in the "Open Lab".

You should ask your lab instructor about these. They use materials that will not be on the lecture exam. However, they will help you remember certain aspects of the skull.

**#1 Disarticulated Skulls**

In the room, there is a colored skull that can be disarticulated *(image 1 below)*. Ask your instructor to disarticulate it for you as shown below, showing excellent views of the often difficult to see ethmoid, sphenoid and vomer.

Also in the room there is a disarticulated skull in a black box *(image 2 below)*. Compare the two.

**#2 Ear ossicles**. There may be a small plastic disk containing the bones of the middle ear *(image 3 shows the bones, next to a dime for size comparison)*. Bring them to your desk and compare them to the skull at your desk. Both are real-life sized. Where are these ossicles in the human skull?

**#3 Sinuses**

There may be a dissected skull in the room *(image 4)*, which will demonstrate the sinuses. This is real bone, and VERY FRAGILE! Ask your instructor to demonstrate the sinuses, using this skull.