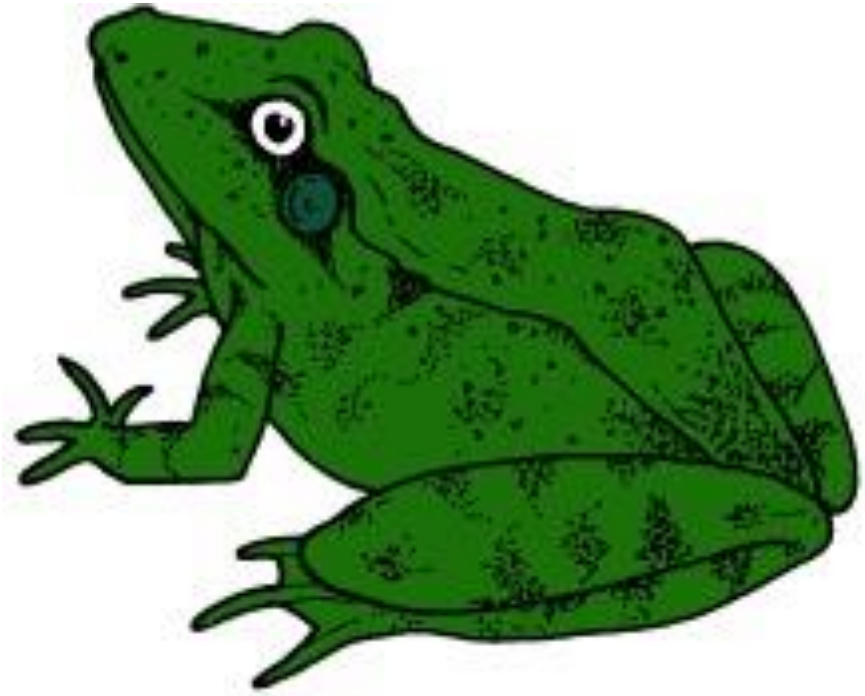
Frog Dissection



Dissection does not mean “to cut up”, it actually means “to expose to view”

Lab Behavior Expectations

- You are expected to behave appropriately in this lab setting.
- If at ANY time, I feel that your behavior is inappropriate you will be asked to stop the lab.
- You will also face disciplinary action and MY WRATH!!!!

Video

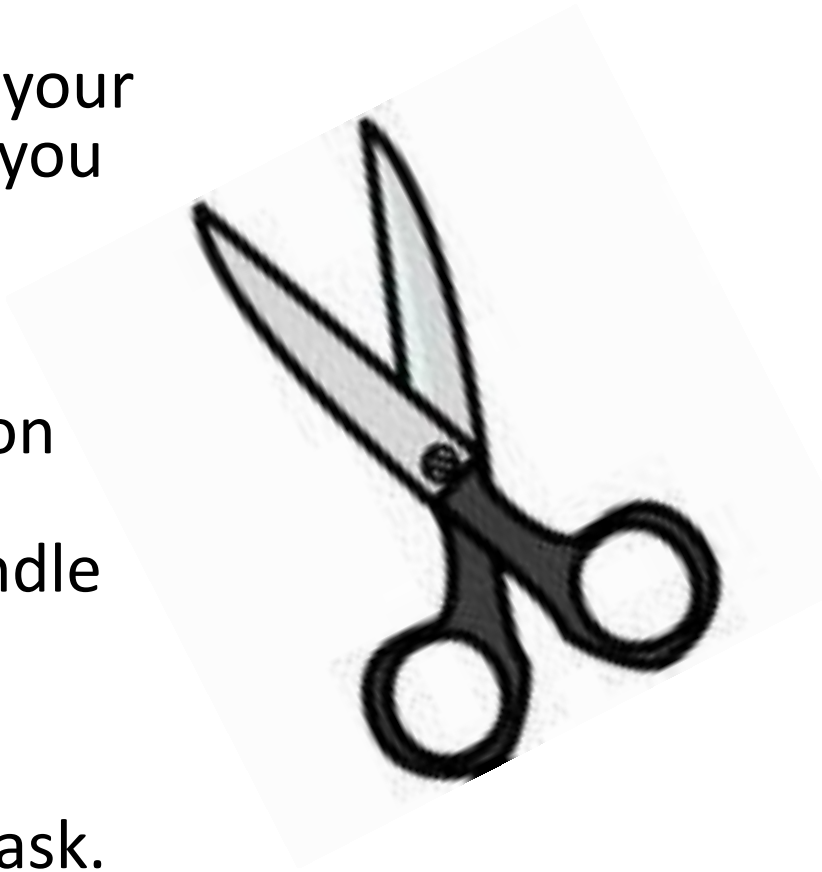
- Frog Dissection
- Frog Dissection – Part 1
- Frog Dissection – Part 2
- Frog Life

Before we proceed

While dissecting, be respectful of your lab partners and of the specimen you are about to explore, observe and learn from.

Take extra care with your dissection tools. Your scissors are your most important tool, but be sure to handle them carefully and always double check instructions before cutting.

If you have any questions, please ask.



Purpose and Terms

Purpose:

- Investigate the anatomy and organ systems of the frog.
- To observe the relationship between organ structure and function.
- To compare frog and human anatomy to better understand body systems.

Vocabulary:

- Dorsal – toward the back
- Ventral – toward the belly
- Lateral – toward the sides
- Median – toward the middle
- Anterior – toward the head
- Posterior – toward the tail

Working in Pairs for Dissections

Partner Roles:

- Every other step will be hands on. Pick one person to start and then alternate. If you are the person dissecting, then the other person in the pair is assisting. After the dissection is completed, share your observations so that both people have a completed lab report. Conclusion questions will be individual work.

Getting Ready

Materials:

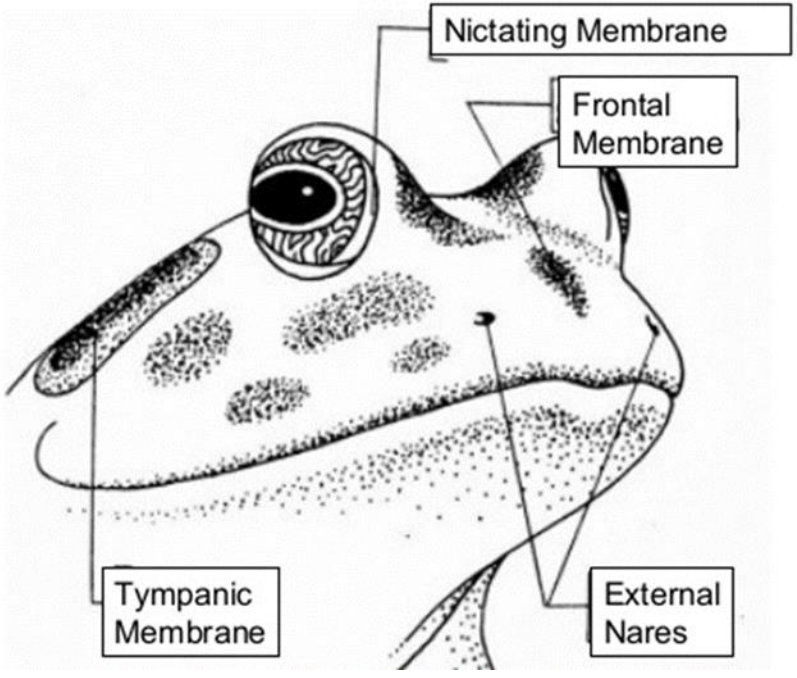
- Gloves
- Forceps
- Hand lens
- Dissecting tray
- Scalpel
- Probe
- Preserved frog
- Dissecting scissors
- Dissecting pins

Preparation:

- Tie hair back, put on apron if you desire and get a pair of gloves.
- Partner 1 – get tray, frog
- Partner 2 – get instruments and paper towel
- Both partners lay out supplies at their lab table, placing the instruments on the paper towel.
- Decide who will start the dissection, remember to alternate turns!
- When you are ready to begin, look forward and be silent.

Part A – External Anatomy

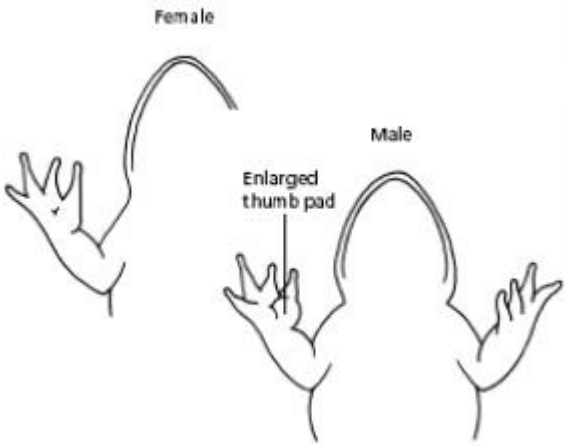
1. Make sure frog is right side up so that you can see the face.
2. Identify the eyes, which have a nictitating membrane that serves to moisten the eye.
3. Identify the tympanic membrane, or eardrum. It is located behind each eye.
4. Find the external nares or nostrils.

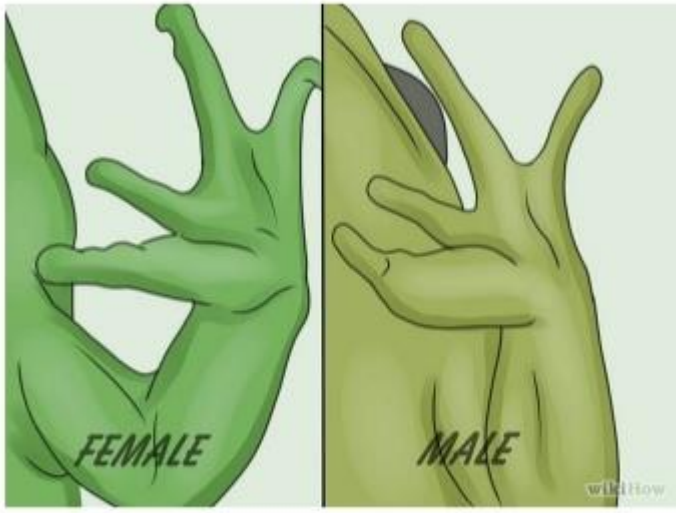


External Anatomy (cont'd)

5. Find the digits, which are like fingers on both the fore and hind limbs

6. Determine if your frog is male or female by looking at the innermost finger of the forelimb.

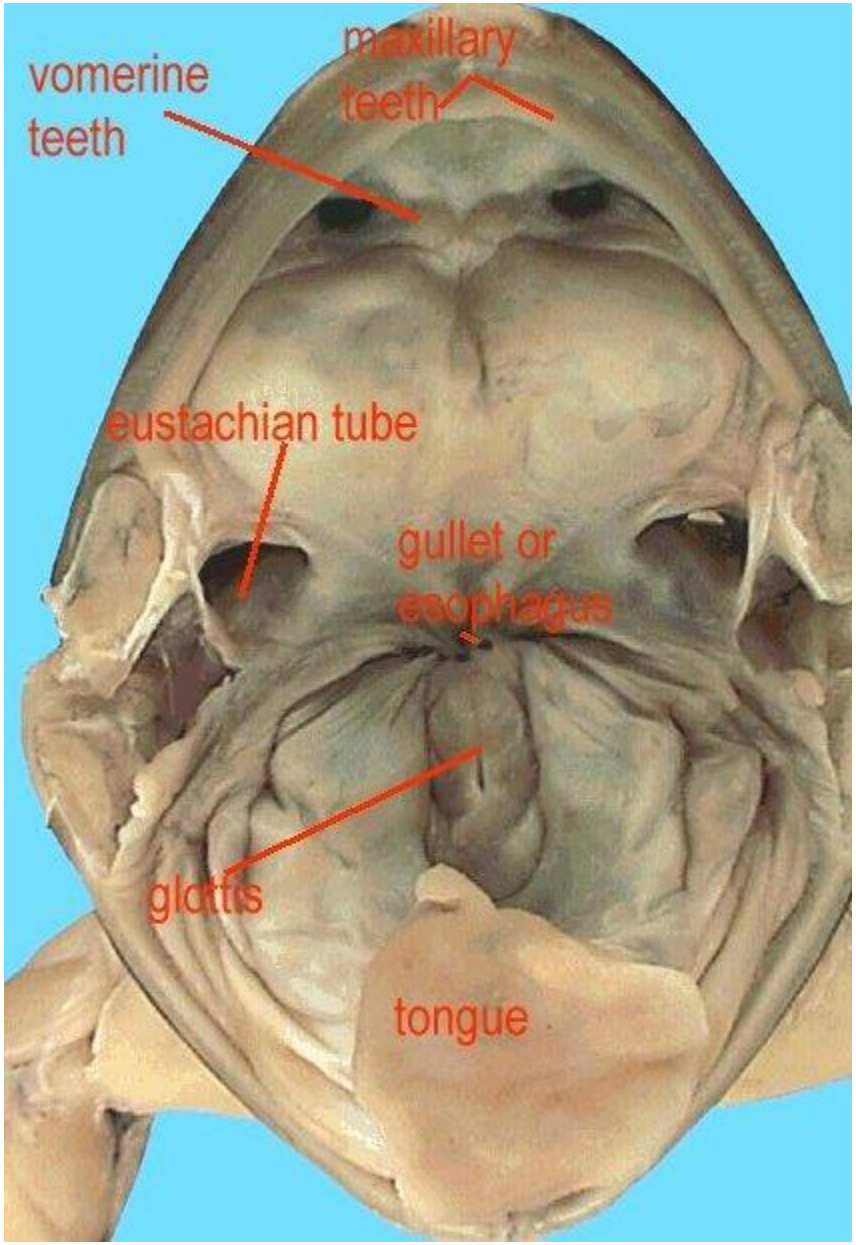




Mouth

1. Pry open the mouth. Use the scissors to cut the corner of the mouth where the **maxilla** (upper jaw) and mandible (lower jaw) join together.

2. Find the tongue and pull it out.

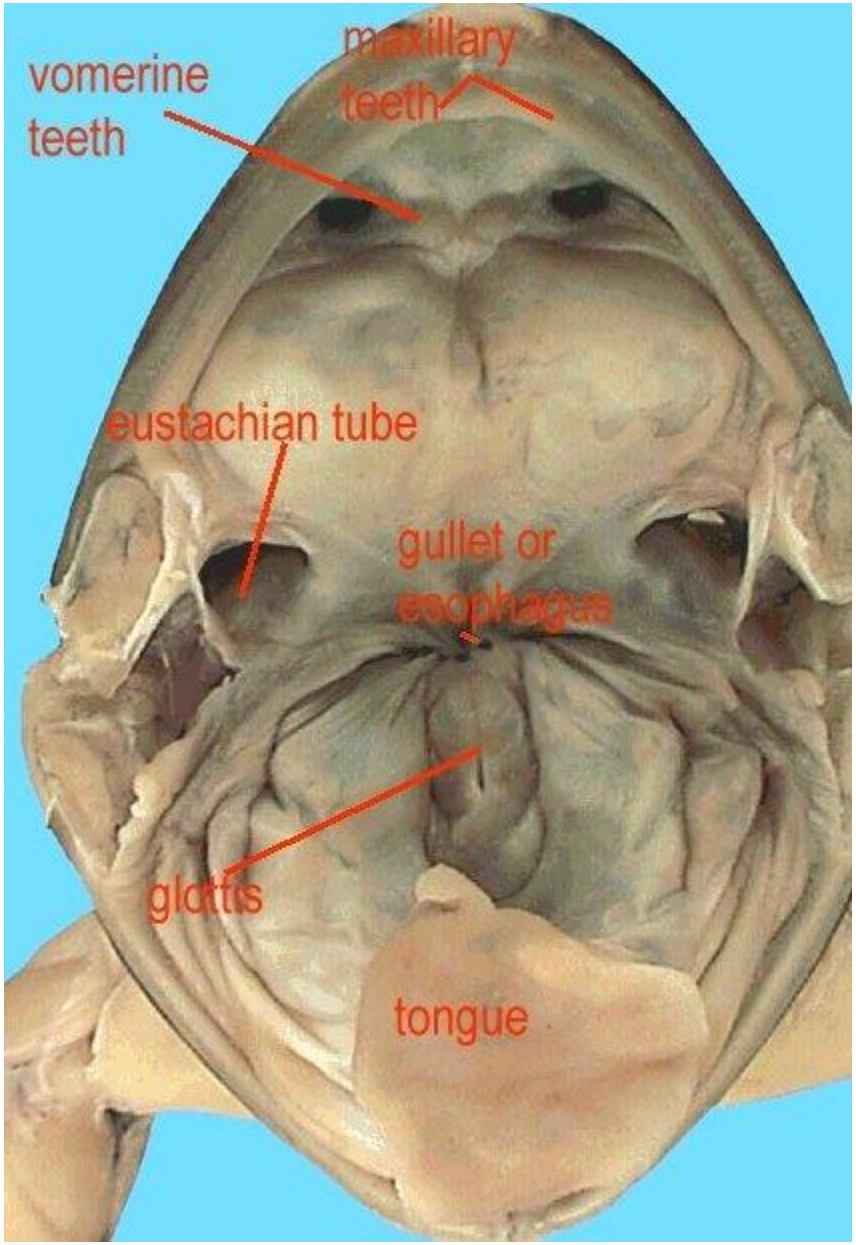


Mouth

3. Feel the **maxillary teeth** that are along the rim of the upper jaw. Notice that only the upper jaw has teeth.

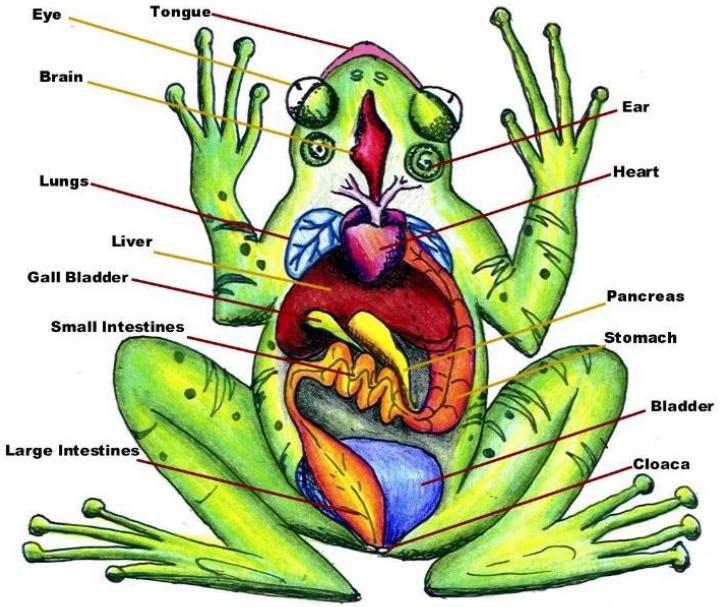
4. Locate the glottis. It is a slit opening for the voice box on the floor of the mouth.

5. Find the esophagus at the rear of the mouth.



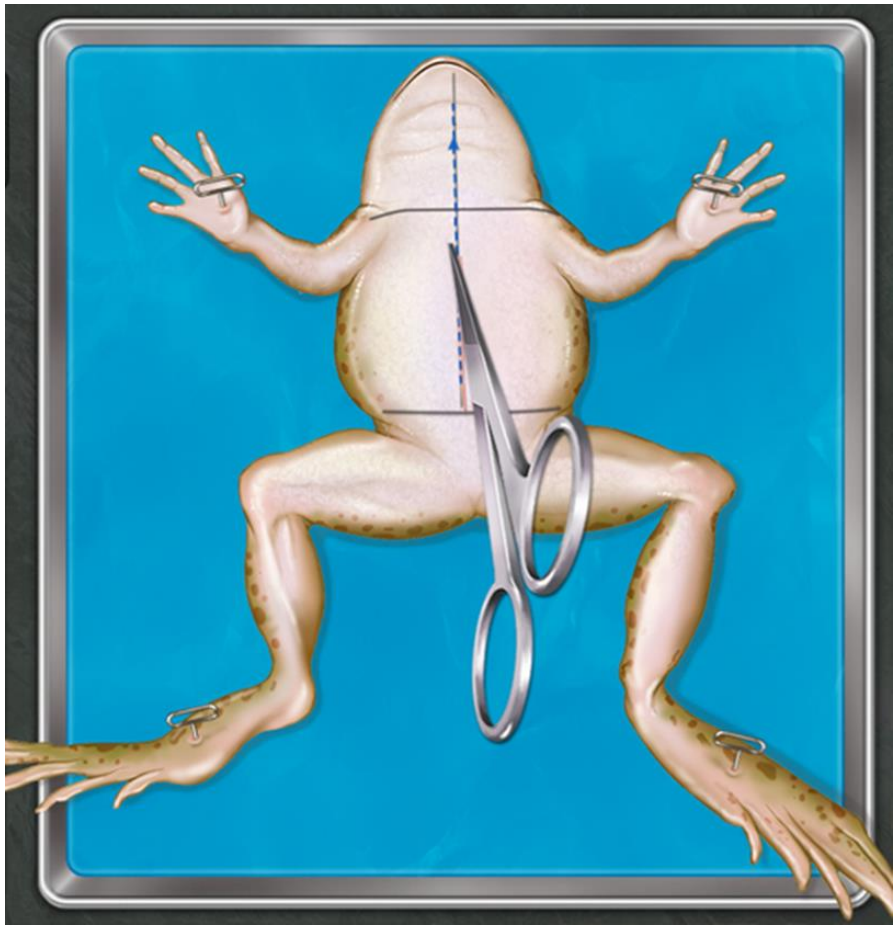
Part C - Internal Anatomy

- This is where the real dissection begins.
- Use your tools carefully and wisely.
- If you are unsure of the directions, ask!



Incision 1: Skin Vertical

1. Place your frog on its back and pin it to the dissecting tray.
2. Lift the frog's skin with forceps between the rear legs.
3. Make a small cut through the lifted skin with the scalpel. This is a starting place for the scissors. Take care to cut only the skin.
4. Use the scissors to continue the incision up to the midline all the way through the frog's skin.
5. Stop cutting when your scissors reach the frog's neck.



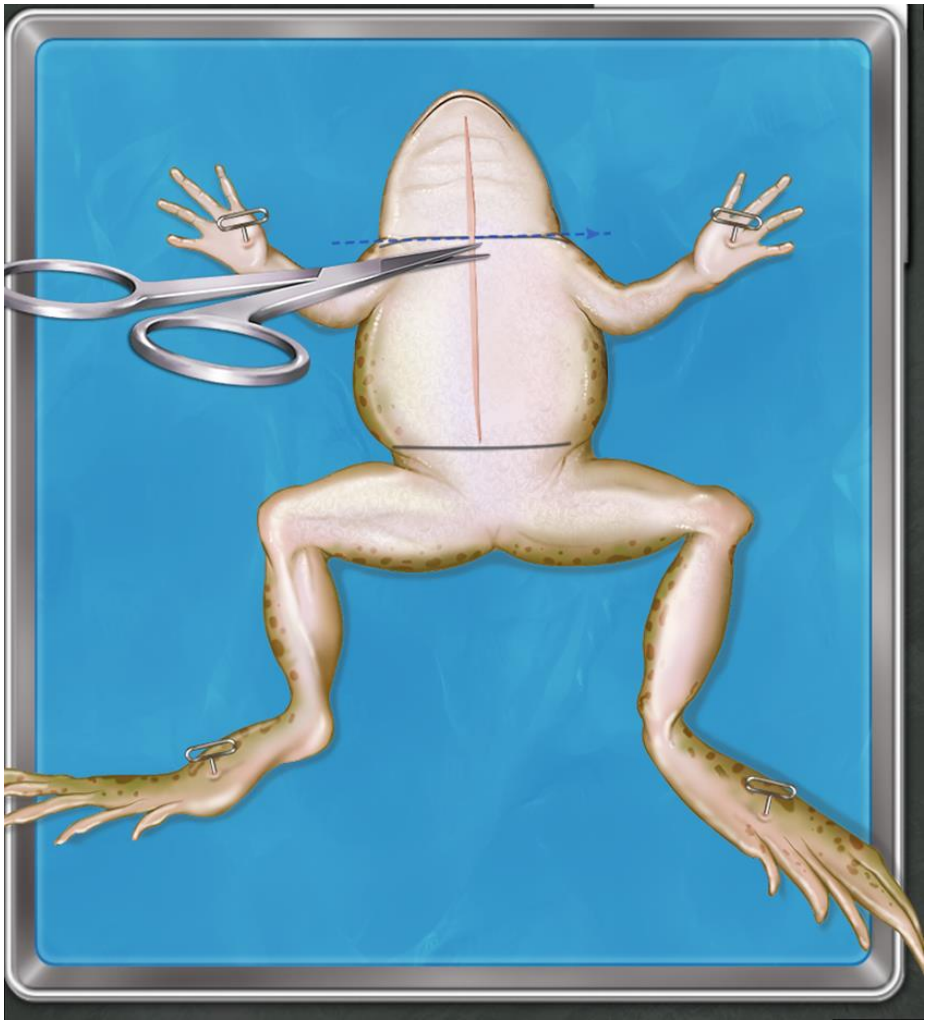
Incision 2: Skin Horizontal

6. Use the scissors to make sideways incisions in the skin.

7. The first incisions are made between the front legs.

- The next incisions are made just above the rear legs

8. Be careful to only cut through the skin, not the muscle.



Incision 3: Separate Skin

9. Pick up the flap of skin with the forceps.

10. Use a scalpel to help separate the skin from the muscle layer below.

- After you've opened the flaps of skin, pin them to the dissection tray.

Incision 4: First Muscle Incision

1. Repeat the incisions, this time through the abdominal muscle. You will find it easier to begin the vertical incision by lifting the muscle layer with the forceps. Do this between the rear legs of the frog.

2. Make a small cut with the scalpel.

3. Using the scissors, continue the incision up the midline to a point just below the front legs.

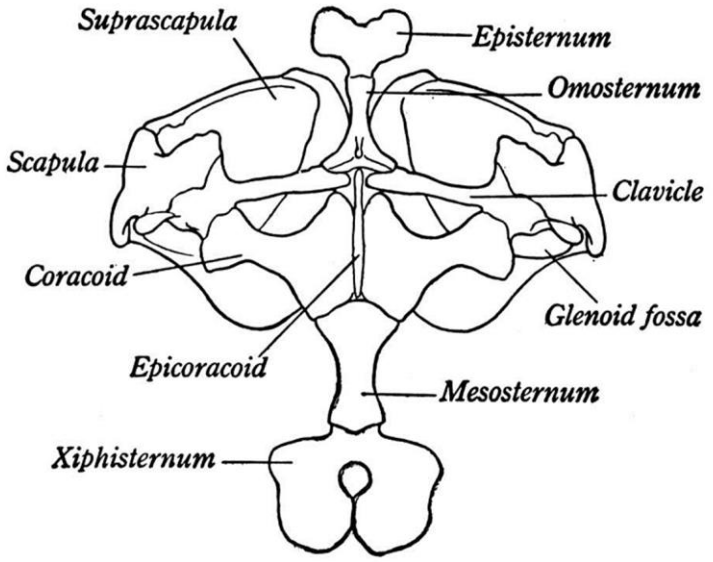
4. Don't cut too deeply. The muscle is thin. It is easy to damage the organs underneath.

Incision 5: Chest Bone

5. Cut through the chest bones. When you reach the point just below the front legs, turn the scissors blades sideways, so that you only cut through the bones in the chest. Be careful that you don't cut too deeply.

- This should prevent damage to the heart or other internal organs.

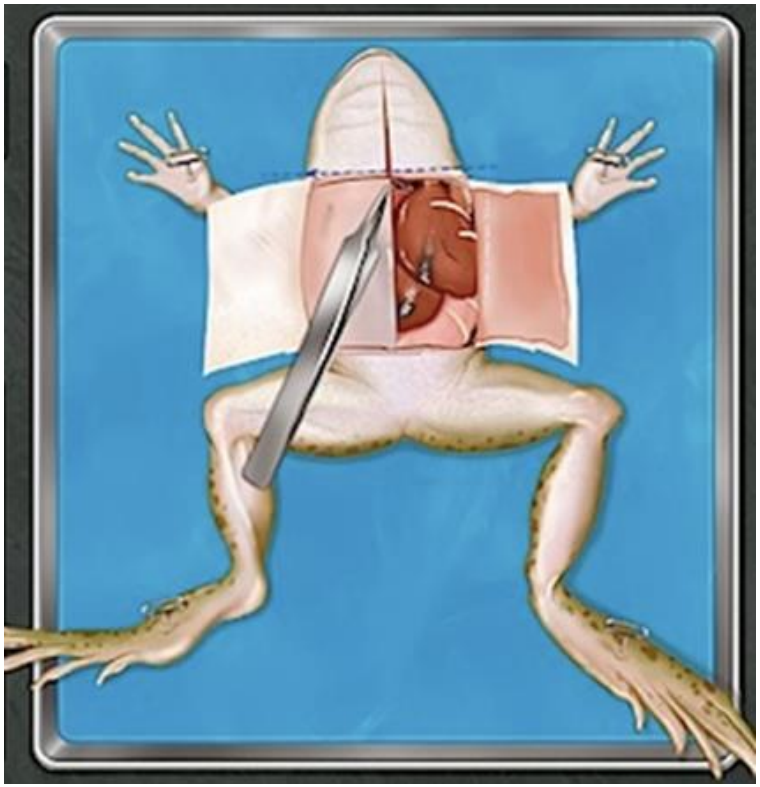
6. When the scissors reach a point just below the frog's neck, you have cut far enough.



Incision 6: Muscle Horizontal

7. Make the horizontal incisions. Just as you did with the skin, make a sideways incision in the muscle with the scalpel.

- Make the first incision between the front legs.
- The next incision is just above the rear legs.
- Again, be careful that you don't cut too deeply.

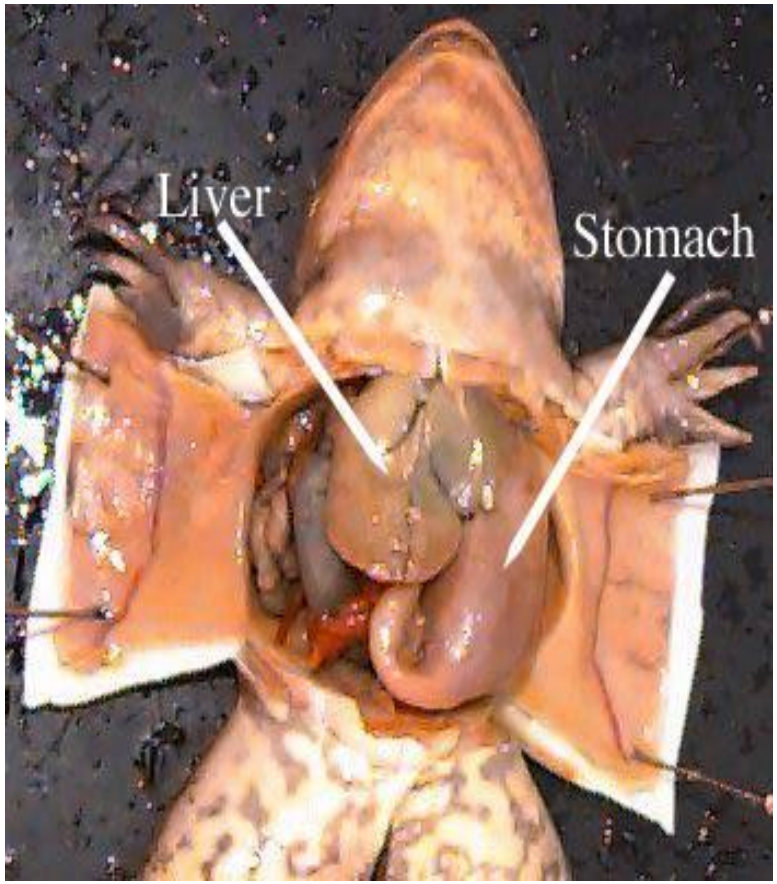


Muscle Separation

8. Separate the muscle flaps from the organs below. Pull back and hold the muscle flaps with the forceps.

9. Use the scalpel to separate the muscle from the organ tissue.

10. Pin the muscle flaps back far enough to allow easy access to the internal organs.



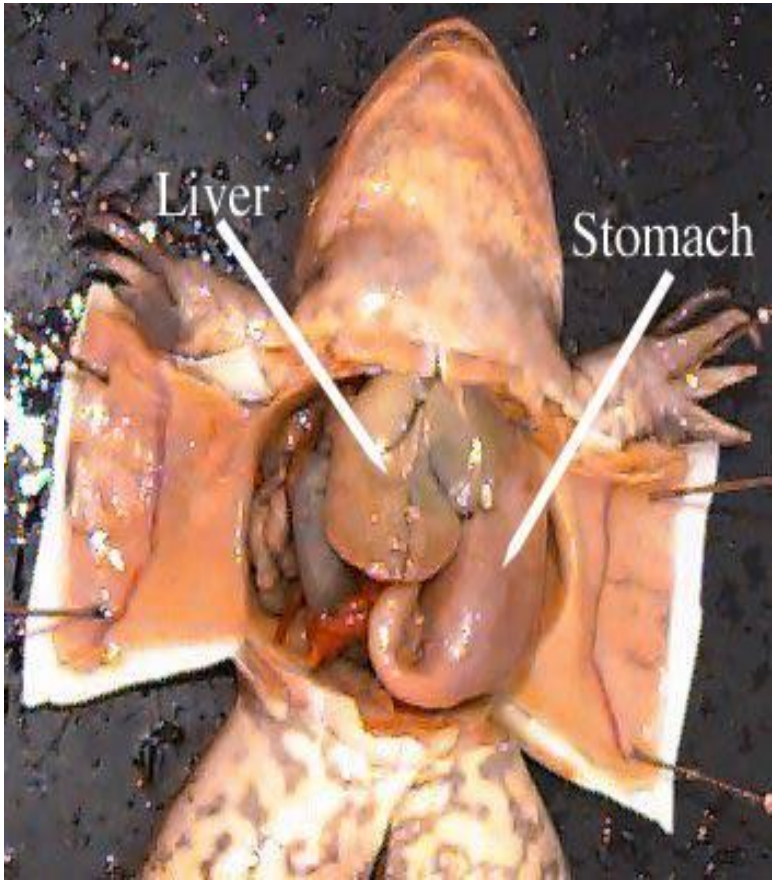
Interesting Facts

Unlike humans, frogs don't store fat next to the skin. Frogs store winter fat in fat bodies found inside the body cavity. If your frog was collected late in the year, the body cavity might be full of yellow-orange fat bodies.

Internal Body Systems

1. We are now ready to explore the frog's anatomy. To make our exploration easier, we will look at the organs in four different layers, beginning with the liver and heart layer.

- As we get deeper into the frog's anatomy, we will reveal new layers.



Liver

- When we pull back the muscles and skin, the first organs we can see are the liver and heart.

2. The liver is a large, brownish colored organ covering most of the body cavity.

Heart

- You should also be able to see the heart in Layer 1.

3. It is a small triangular shaped organ between the front legs, just above the liver.

4. The frog's heart has three chambers. The picture (right) shows only the lower chamber of the heart. Can you find all three chambers?

- How many chambers do you have in your heart?

Layer 2 - Intestines

5. Reveal layer two. The heart and liver in layer one hide some of the organs below them.

6. Use the forceps and the probe to pick up the liver and reveal layer two.

7. Layer two includes the gall bladder, the stomach, and the small intestine.

Gall Bladder

8. Examine the gall bladder. Under the liver, we see a small, greenish sac. This is the gall bladder. You might also see it by separating the right and middle lobes of the liver.

- The gall bladder can be hard to find.

Stomach

9. Examine the stomach. The stomach looks like a sac on the frog's left side (on your right). It is a large firm organ.

Small Intestine

10. Examine the small intestine. The small intestine is a long, folded, tube like organ that is posterior the stomach.

- It is similar in color to the stomach, but smaller in diameter.

Layer 3

11. Reveal layer three. Remove the liver to see the organs in layer three.

12. The liver is easier to remove if you remove the gall bladder and heart at this time.

- Place the organs to the side, but still in the dissection tray.

Lungs

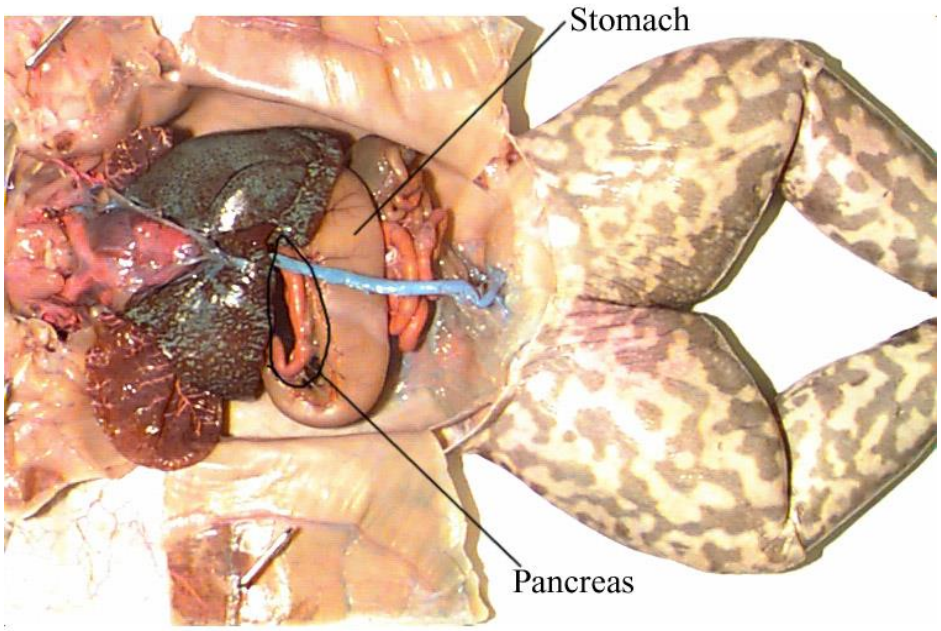
13. Take a close look at the lungs and pancreas. The lungs are difficult to locate in a preserved frog.

- They're at the anterior end of the body cavity on either side of the heart.
- We may need to remove the lungs and place them on the tray as well.

Pancreas

15. You can't see the pancreas without lifting the stomach and intestines with the forceps. The pancreas is a thin, yellowish ribbon.

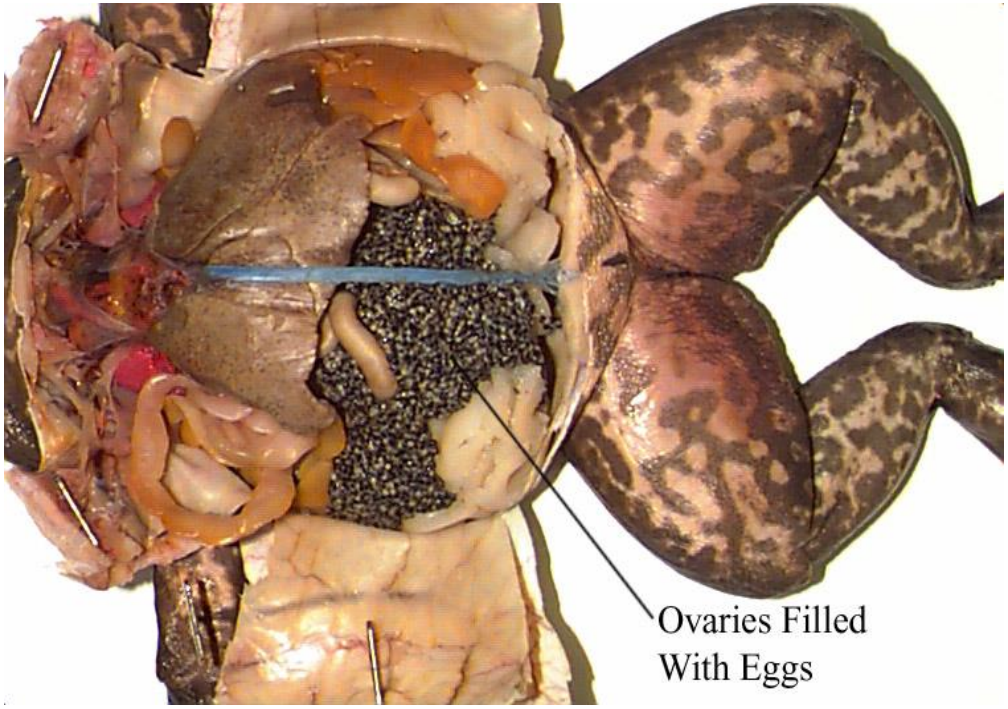
16. The intestines are held in place by thin, transparent tissue called the mesentery.



Female Frogs

17. If you have a female frog, you will need to remove the ovaries before you can see layer four.

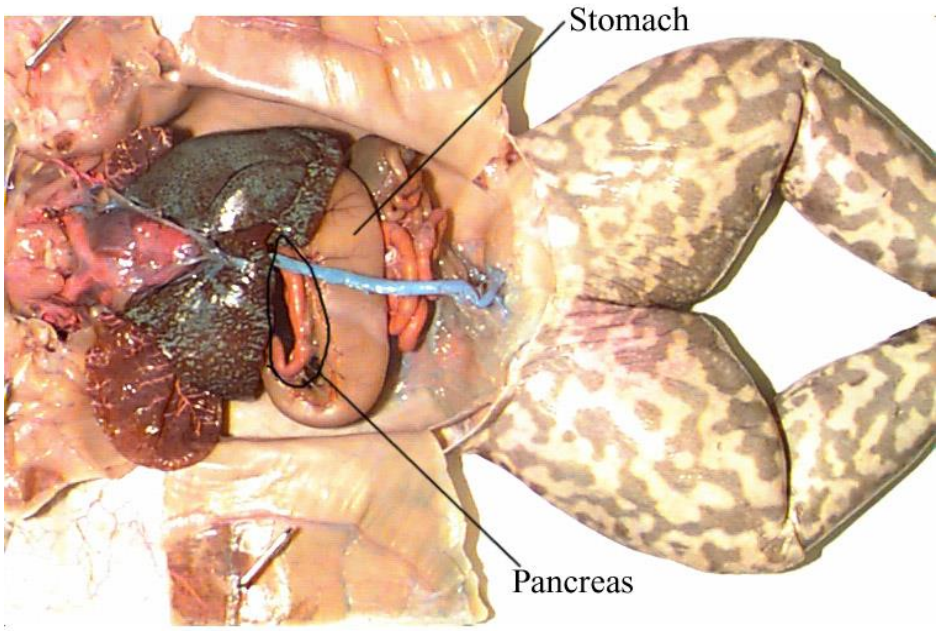
- Place the organs in the tray.



Layer 4

18. To see layer four, you need to remove the stomach, small intestine, large intestine, and pancreas.

- Place the on the tray.



Spleen

19. Examine the spleen. Locate the spleen in the male frog. It is a small, round reddish organ.

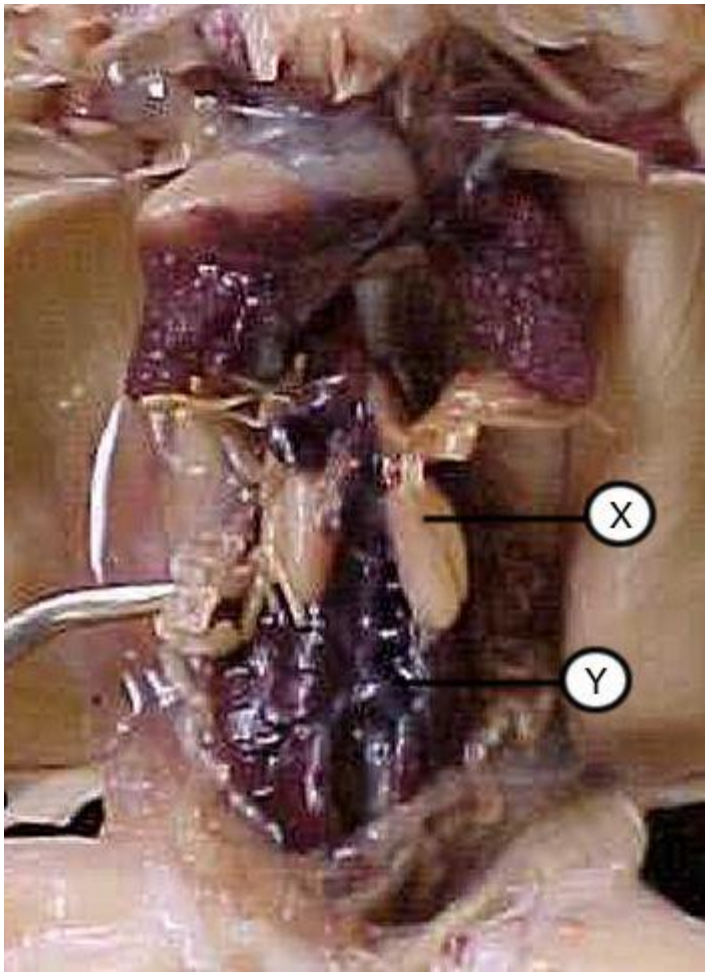
- It is a little more difficult to find the spleen in a female frog

Male Kidneys

20. The kidneys are elongated, brownish colored organs found in the lower part of the frog's abdomen.

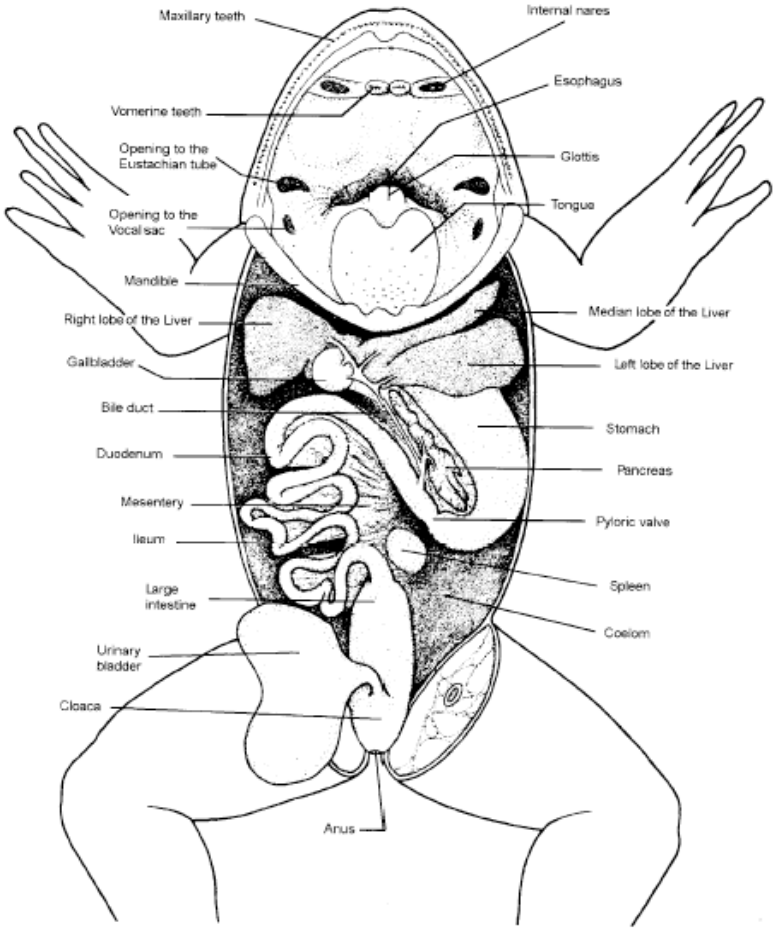
- The kidneys (Y) are situated on each side of the middle of the frog just underneath the testes (X).

21. Female kidneys are located in the same place but can only been seen after removal of the ovaries and oviducts.



Identification

- Use the frog to and what you have just learned to identify frog anatomy
- You may do this with your partner



Clean Up - Tools

- One partner is responsible for cleaning the dissection tools
- Please wait patiently for your turn at the sink
- Follow all instructions on cleaning:

1. Place your tools carefully in the sink.
2. Rinse the tools well with water (watch sharp areas) and place on paper towels
3. Wipe up any spills

Clean Up – Frog and Tray

- Second partner is responsible for cleaning the tray and disposing of the frogs
- Please walk the frog still in the tray to the disposal area.
- Follow all instructions on cleaning:

1. Place your frog and parts in the bio bag.
2. Throw away closed bag
3. Rinse tray and wipe down.
4. Place where shown on counter.

Clean Up – Work area

- Both partners are responsible for cleaning the lab work area
- Please come get a disposable wipe
- Wipe off your work area thoroughly
- Throw away the wipes

Homework

- Conclusion Questions are independent work
- The last question has a research component to it – make sure to read the instructions and follow through.