

# Dissecting a Frog

## Background

Frogs belong to the class Amphibia. Amphibians have adaptations for living in terrestrial as well as aquatic environments. Frogs are among the most commonly studied organisms in biology. Although many differences exist between humans and frogs, the basic body plans are similar. Humans and frogs both belong to the phylum Chordata. By studying the anatomy of the frog, you will be better able to understand your own body. In this investigation you will observe the external features of a preserved frog and identify parts of its external anatomy. You will also dissect the preserved frog to observe its internal anatomy and make comparisons to human anatomy.

## Objective

- Compare body systems of a frog to those of a human.

## Materials Needed

- Old scissors or a knife
- Plate or baking tray to place the frog on
- Frog
- Instructions

## Pre-Lab Questions

1. Define the following terms related to the positioning of the frog:
  - a. Dorsal
  - b. Ventral
  - c. Anterior
  - d. Posterior
2. The fat bodies in frogs are yellowish to orange in color. They have a finger-like or spaghetti-like shape. What is the function of the fat bodies in the frog? How does this compare to the human body?
3. What is the secretion of the gall bladder? What is its role in digestion? How does this compare to the human body?

## Dissection Instructions

### PART A - EXTERNAL EXAMINATION

1. Identify the dorsal and ventral surfaces and the anterior and posterior ends of the frog. Notice the color on each surface of the frog.

2. Locate the forelegs and the hindlegs. Each foreleg, or arm, is divided into four regions: upper arm, forearm, wrist, and hand. Each hindleg also has four regions: thigh, lower leg, ankle, and foot. Identify the parts of the forelegs and hindlegs. Examine the hands and feet of the frog. If the hands have enlarged thumbs, the frog is male. How many digits are on each hand and foot? Is your frog a male or female?
3. Locate the two large, protruding eyes. Lift the outer eyelid using a probe. Beneath the outer lid is an inner lid called the nictitating membrane.
4. Posterior to each eye is a circular region of tightly stretched skin. This region is the tympanic membrane, or eardrum. Locate the tympanic membranes on both sides of the head.
5. Anterior to the eyes, locate two openings called the external nares (singular, naris), or nostrils.
6. Hold the frog firmly in the dissecting tray. Using scissors, make a small cut at each of the hinged points of the jaw. CAUTION: To avoid injury, cut in a direction away from your hands and body. Open the mouth as much as possible. Under running water, rinse away any excess preservative.
7. The tongue is the most noticeable structure in the mouth. Observe where the tongue is attached and note the two projections at the free end.
8. At the back of the mouth, locate the large horizontal opening, the gullet opening. In front of the gullet opening, find a vertical slit, and the glottis.
9. Look for two openings on the backsides of the floor of the mouth. These are the openings to the vocal sacs. They are present in male frogs but not in female frogs
10. Examine the roof of the mouth. Near the front center of the roof of the mouth are two small bumps. These bumps are the vomerine teeth. On either side of the vomerine teeth are the openings of the internal nares. Behind the vomerine teeth, observe two large bulges. These bulges are the eye sockets. Run your finger along the top jaw. The teeth you feel are the maxillary teeth.

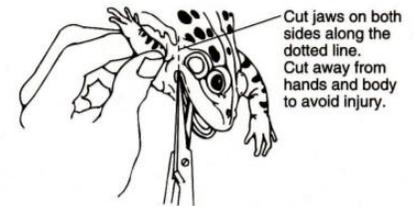
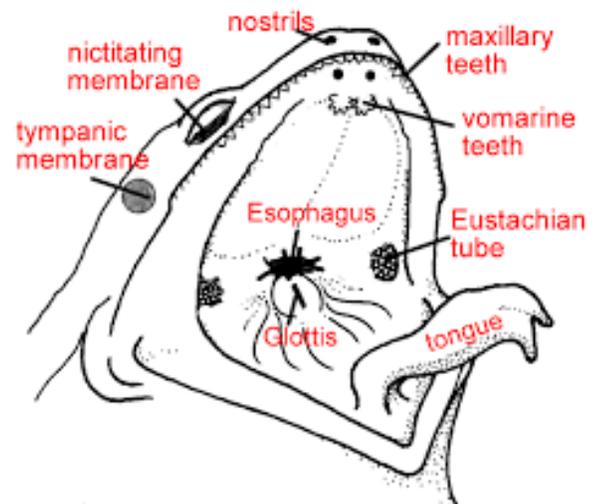


Figure 1



## PART B - INTERNAL ANATOMY

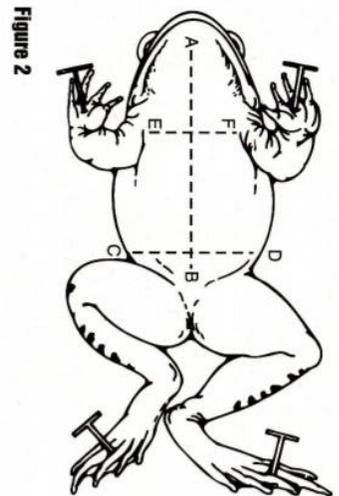
11. Make the following labels for your frog:
 

a. Right lung	g. Large intestine
b. Left lung	h. Liver
c. Gall bladder	i. Fat bodies

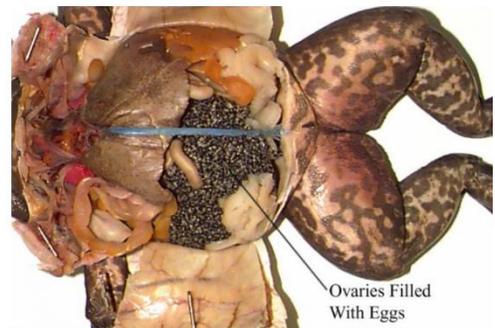
- d. Stomach
- e. Pancreas
- f. Spleen

- j. Small intestine
- k. Urinary bladder

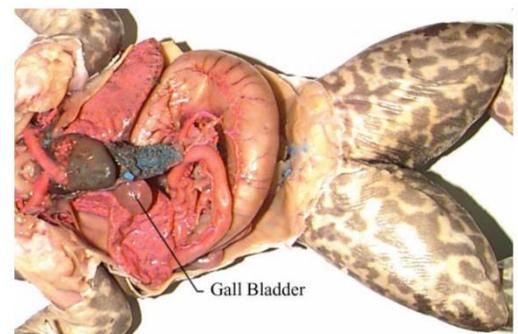
12. Place the frog in the pan ventral side up.
13. Use an old pair of scissors or a knife to lift the abdominal muscles away from the body cavity. Cut along the midline of the body to the forelimbs.
14. Make transverse (horizontal) cuts near the arms and legs.
15. Lift the flaps of the body wall. If they will not lay open, you may have to cut down the side. \*If your specimen is a female, the body may be filled with eggs. You may need to remove these eggs to view the organs.
16. Once you have the flaps laid back away from the body, notice the fat bodies. Remove these to get them out of the way.
17. Once you have the flaps laid back away from the body, begin labeling the parts of the internal anatomy. Use the diagram below to help you identify the parts. Once you have the parts labeled, **take a couple of good pictures of your labels**. After you take those pictures, remove the labels and continue on.
18. Study the positions of the exposed organs. Notice that most of the organs are held in place by thin, transparent tissues called mesenteries.



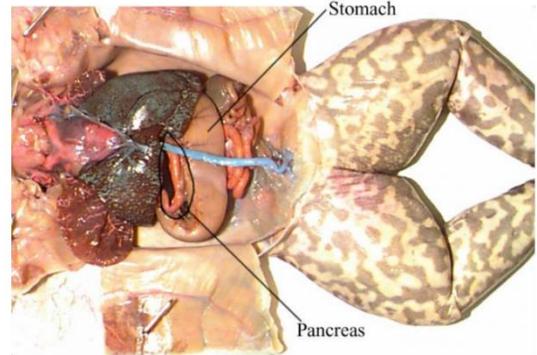
19. If the frog is a mature female, the most obvious organs will be the ovaries. The ovaries are white sacs swollen with tiny black-and-white eggs. Carefully lift the ovaries from the body cavity, cut the attachments with scissors, and remove the ovaries from the frog. Note: Be careful not to rupture the ovaries with scissors. If the ovaries are ruptured, the eggs inside can spill out.
20. The large reddish-brown organ in the upper part of the abdominal cavity is the liver. How many lobes does the liver contain?



21. With your fingers, lift and separate the lobes of the liver upward. Behind the middle lobe, look for a greenish, finger-shaped gland. This gland is the gallbladder. You may be able to locate the bile duct leading from the liver to the gallbladder. **Take a photo showing the gallbladder.**
22. With scissors, carefully remove the liver and gallbladder from the body. The remaining organs of the digestive system are easier to see with the liver removed.



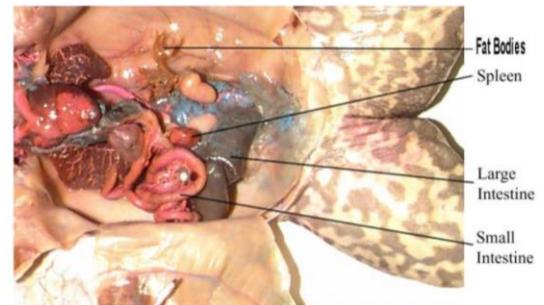
23. Locate the esophagus, which is a white tube leading from the mouth and connecting to the upper part of the white, muscular stomach. Notice the shape of the stomach. Look for a constriction at the lowest part of the stomach. This constriction is the pylorus. The pylorus leads into the long, coiled small intestine. Pull the loops of small intestine away from the body. **Take a photo.** Notice the mesentery that holds the intestines in place. Inside the first loop of the small intestine near the stomach, locate a thin, white organ called the pancreas. In the intestinal mesentery, locate a brown bean-shaped organ called the spleen. The spleen is an organ of the circulatory system.



24. The small intestine ends in a large bag-shaped organ, the large intestine. The last organ of the digestive system is the cloaca, a saclike organ at the end of the large intestine. Undigested food leaves the frog's body through an opening called the anus.

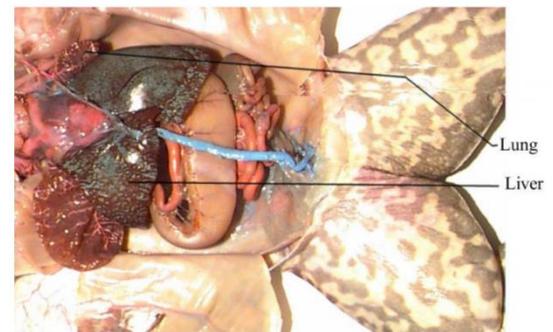
25. With scissors, cut the esophagus near the stomach. Cut through the large intestine just above the cloaca. With your fingers, carefully remove the digestive system from the body.

26. Stretch out the digestive system on the dissecting tray. **Take a photo.** With scissors, cut open the stomach along its outside curve. Open the stomach and examine its structure and contents. Observe the inside of the stomach. Describe the contents of the frog's stomach. **Take a photo.**



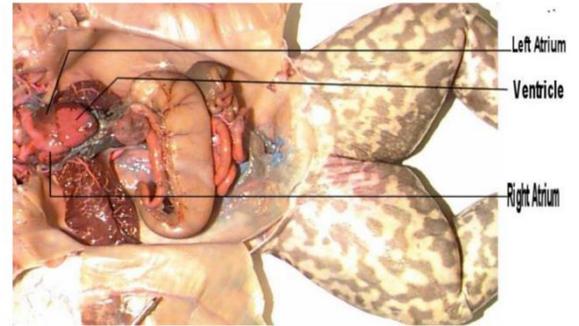
27. Dispose of the digestive system, liver, and ovaries according to your teacher's instructions - place all pieces back into the Ziploc baggie that the frog came in.

28. Locate the two lungs. They are small, spongy brown sacs that lie to the right and left of the heart. Look for the bronchial tubes that extend from the anterior part of the lungs and join with the trachea, or windpipe. With scissors and toothpicks, carefully remove the lungs from the frog's body. Dispose of the lungs according to your teacher's instructions - Ziploc baggie.

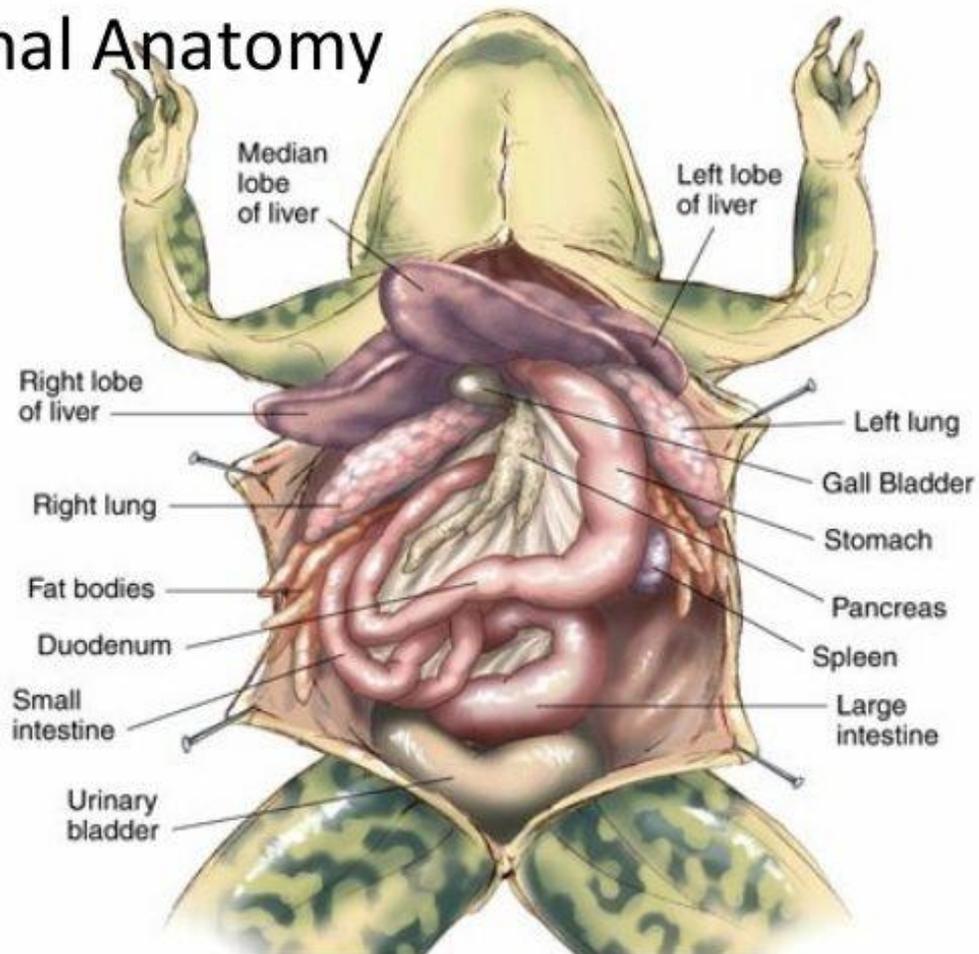


29. Locate the heart. The heart is encased in a membranous sac called the pericardium. With the tip of the scissors, carefully cut open the pericardium. 23. Note the vessels attached to the heart. The large artery on the ventral surface of the heart is the coronary artery.

30. Remove the heart from the frog. **Take a photo.**
31. With the knife, cut the heart into anterior and posterior halves. Note the thickness of the walls and the types of heart chambers. **Take a photo.**
32. Place all pieces of the frog in the Ziploc baggie to be disposed of in the trash.



## Internal Anatomy



## Post Lab Questions

1. When you cut open the frog to expose the internal organs, what two structures might you have had to remove to actually see all of the internal organs?
2. Describe the contents of the stomach.
3. What is the membrane that holds the coils of the small intestine together?
4. This organ is found under the liver and stores bile.
5. The yellowish structures that serve as an energy reserve all called

**After filling out the answers on a word document, insert your photos into that word document and save as a pdf. Send as one document.**