

Frog Dissection

Procedure:

Part A: External Structure of Frog

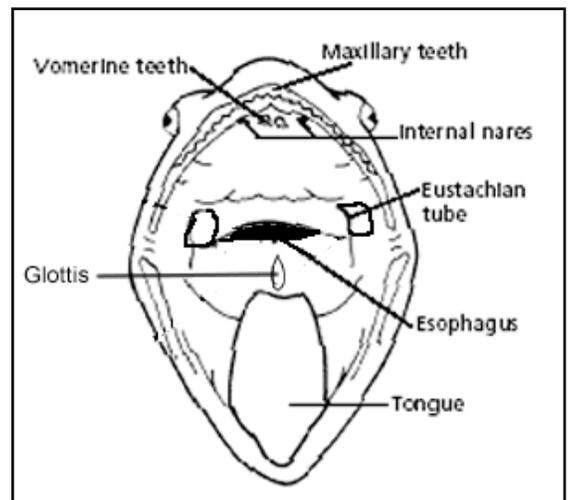
1. Observe the dorsal (top) and ventral (bottom) sides of the frog. Record the color of each in Table 1.
2. Examine the hind legs. Record how many toes are present on each hind foot in Table 1.
3. Examine the forelegs. Record how many toes are present on each front foot in Table 1.
4. To determine the frog's sex, look at the hand digits, or fingers, on its forelegs. A male frog usually has thick pads on its "thumbs," which is one external difference between the sexes. Male frogs are also usually smaller than female frogs. Observe several frogs to see the difference between males and females
5. Use a ruler to measure your frog, measure from the tip of the head to the end of the frog's backbone (do not include the legs in your measurement). Record your frog's length and four others in Table 1.
6. Locate the frog's eyes, the nictitating membrane is a clear membrane that attached to the bottom of the eye. Use tweezers to carefully remove the nictitating membrane. You may also remove the eyeball. Record the color of the nictitating membrane and eyeball in Table 1.
7. Just behind the eyes on the frog's head is a circular structure called the tympanic membrane. The tympanic membrane is used for hearing. Measure the diameter (distance across the circle) of the tympanic membrane and record in Table 1.
8. Feel the frog's skin. Observe if it is slimy or scaly.

Part B: Anatomy of the Frog's Mouth

1. Pry the frog's mouth open and use scissors to cut the angles of the frog's jaws open. Cut deeply enough so that the frog's mouth opens wide enough to view the structures inside.
2. Locate the tongue. Play with the tongue. (You may remove the tongue) Record where the tongue is attached in the mouth in Table 2.

Materials:

Dissection pan
Frog (preserved)
dissection kit
dissecting pins
magnifying lens



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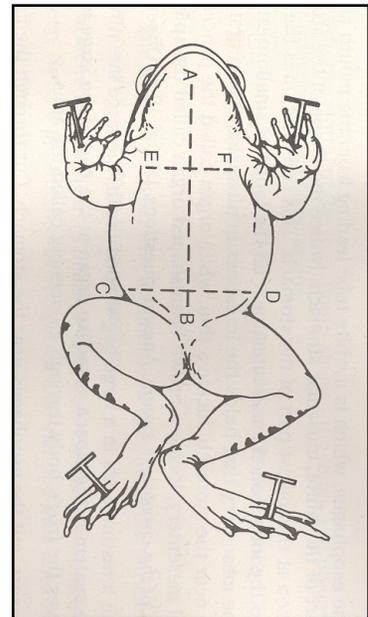
3. In the center of the mouth, toward the back is a single round opening. This is the esophagus. This tube leads to the stomach. Use a probe to poke into the esophagus.
4. Close to the angles of the jaw are two openings, one on each side. These are the Eustachian tubes. They are used to equalize pressure in the inner ear while the frog is swimming.
5. Insert a probe into the Eustachian tube. Record what structure the Eustachian tube is attached to in Table 2.
6. Just behind the tongue, and before you reach the esophagus is a slit like opening. (You may need to use your probe to get it to open up). This slit is the glottis, and it is the opening to the lungs. The frog breathes and vocalizes with the glottis.
7. The frog has two sets of teeth. The vomarine teeth are found on the roof of the mouth. The maxillary teeth are found around the edge of the mouth. Both are used for holding prey, frogs swallow their meals whole and do NOT chew. Count how many vomarine teeth are in the frog's mouth and record in Table 2.
8. On the roof of the mouth, you will find two tiny openings, if you put your probe into those openings, you will find they exit on the outside of the frog. These are the nostrils.

Part C: Internal Anatomy of the Frog

1. Place the frog in the dissecting pan ventral side up. Pin down his two front feet and two hind feet to the tray.
2. Look for the opening to the frog's cloaca, located between the hind legs. Use forceps to lift the skin and use scissors to cut along the center of the body from the cloaca (B) to the lip (A).
3. Make transverse (horizontal) cuts near the arms and legs. Cut from the center line to C. Cut from the center line to D. Cut from the center line to E. Cut from the center line to F.
4. Lift the flaps of the body wall and pin back.

* If your specimen is a female, the body may be filled with eggs and an enlarged ovary. You may need to remove these eggs to view the organs.

5. Locate each of the organs below:



Fat Bodies: Spaghetti shaped structures that have a bright orange or yellow color, if you have a particularly fat frog, these fat bodies may need to be removed to see the other structures. Usually they are located just on the inside of the abdominal wall.

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Liver: The largest structure of the body cavity. This brown colored organ is composed of three parts, or lobes. The right lobe, the left anterior lobe, and the left posterior lobe. The liver is not primarily an organ of digestion, it does secrete a digestive juice called bile. Bile is needed for the proper digestion of fats.

Heart: At the top of the liver, the heart is a triangular structure. The left and right atrium can be found at the top of the heart. A single ventricle located at the bottom of the heart. The large vessel extending out from the heart is the conus arteriosus. The heart is responsible for pumping the blood to the rest of the body.

Lungs: Locate the lungs by looking underneath and behind the heart and liver. They are two spongy organs. They oxygenate the blood.

Gall bladder: Lift the lobes of the liver, there will be a small green sac under the liver. This is the gall bladder, which stores bile. (hint: it kind of looks like a booger)

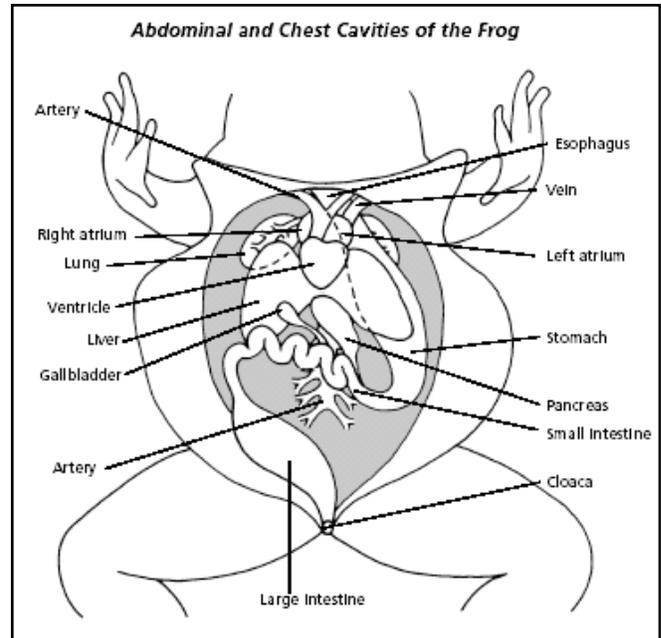
Stomach: Curving from underneath the liver is the stomach. The stomach is the first major site of chemical digestion. Frogs swallow their meals whole. Follow the stomach to where it turns into the small intestine. The pyloric sphincter valve regulates the exit of digested food from the stomach to the small intestine.

Small Intestine: Leading from the stomach. The first straight portion of the small intestine is called the duodenum, the curled portion is the ileum. The ileum is held together by a membrane called the mesentery. Note the blood vessels running through the mesentery, they will carry absorbed nutrients away from the intestine. Absorption of digested nutrients occurs in the small intestine.

Large Intestine: As you follow the small intestine down, it will widen into the large intestine. The large intestine is also known as the cloaca in the frog. The cloaca is the last stop before wastes, sperm, or urine exit the frog's body. (The word "cloaca" means sewer)

Esophagus: Return to the stomach and follow it upward, where it gets smaller is the beginning of the esophagus. The esophagus is the tube that leads from the frog's mouth to the stomach. Open the frog's mouth and find the esophagus, poke your probe into it and see where it leads.

STOP! If you have not located each of the organs above, do not continue on to the next steps of the lab. Call Mr. Miller over to help you identify the different organs of the frog.



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6. Lung Inflation: Insert the tip of a pipette into the glottis in the mouth. When you squeeze the pipette you should see the lungs inflate if you have not damaged the lung.
7. Removal of the Stomach: Cut the stomach out of the frog and open it up. You may find what remains of the frog's last meal in there. Look at the texture of the stomach on the inside. Record what you found in the stomach in Table 3.
8. Measuring the Small intestine: Remove the small intestine from the body cavity and carefully separate the mesentery from it. Stretch the small intestine out and measure it. Now measure your frog. Record the measurements in Table 3.
9. Locate each of the organs below.
Kidneys: Flattened bean shaped organs located at the lower back of the frog, near the spine. They are often a dark color. The kidneys filter wastes from the blood.
Testes: In male frogs, these organs are located at the top of the kidneys, they are pale colored and roundish. They produce the sperm for the frog.
Oviducts: Females do not have testes, though you may see a curly-q type structure around the outside of the kidney, these are the oviducts. Oviducts are where eggs are produced.
Bladder: An empty sac located at the lowest part of the body cavity. The bladder stores urine.
10. WARNING: Give all dissected materials to your teacher for disposal. Always wash your hands after a dissection procedure.

Observations:

Table 1 - External Structure of Frog

Dorsal Side Color	Toes on right hind foot	Toes on left hind foot
Ventral Side Color	Toes on right front foot	Toes on left front foot
Length of Frogs (cm)		
Nictitating membrane color	Eyeball color	Diameter of tympanic membrane (cm)

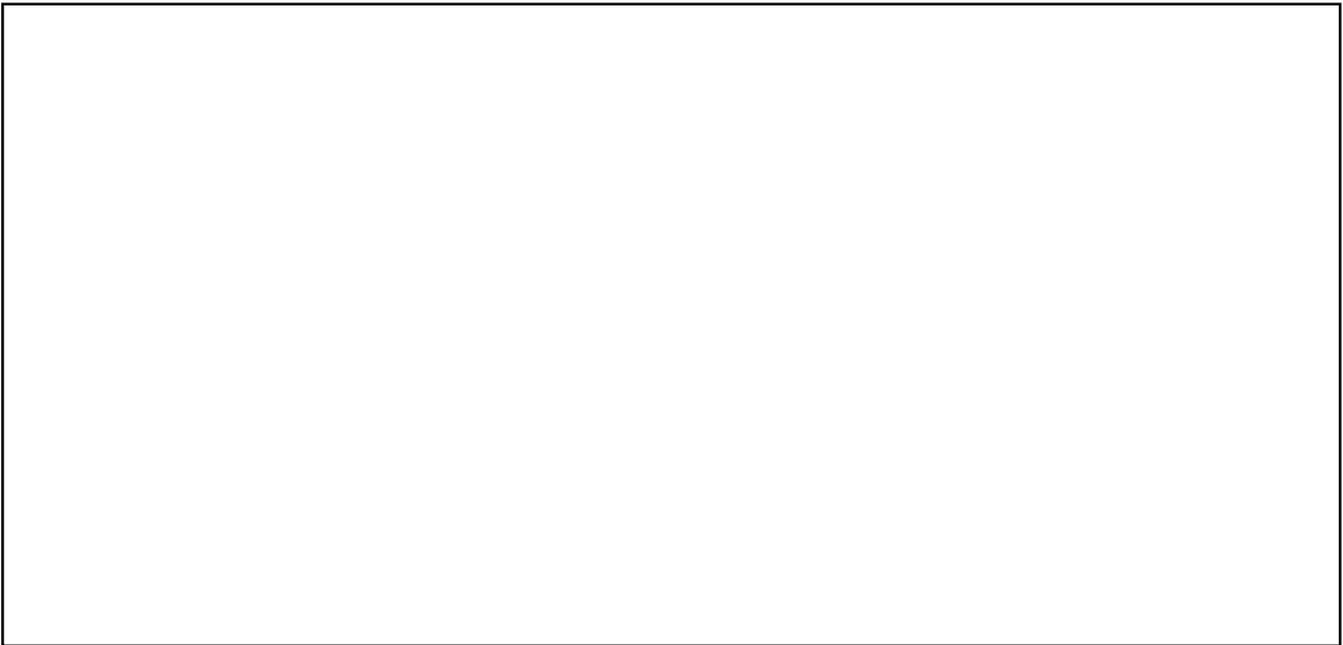
Name: _____ Homeroom: _____

Part B:

Table 2 - Anatomy of the Frog's Mouth

Location of where tongue is attached	Structure Eustachian Tube is attached to	Number of Vomerine teeth

Sketch of the parts of the frog's mouth. May include actual picture of the frog's mouth. Label tongue, esophagus, glottis, Eustachian tube, vomerine teeth, and maxillary teeth.



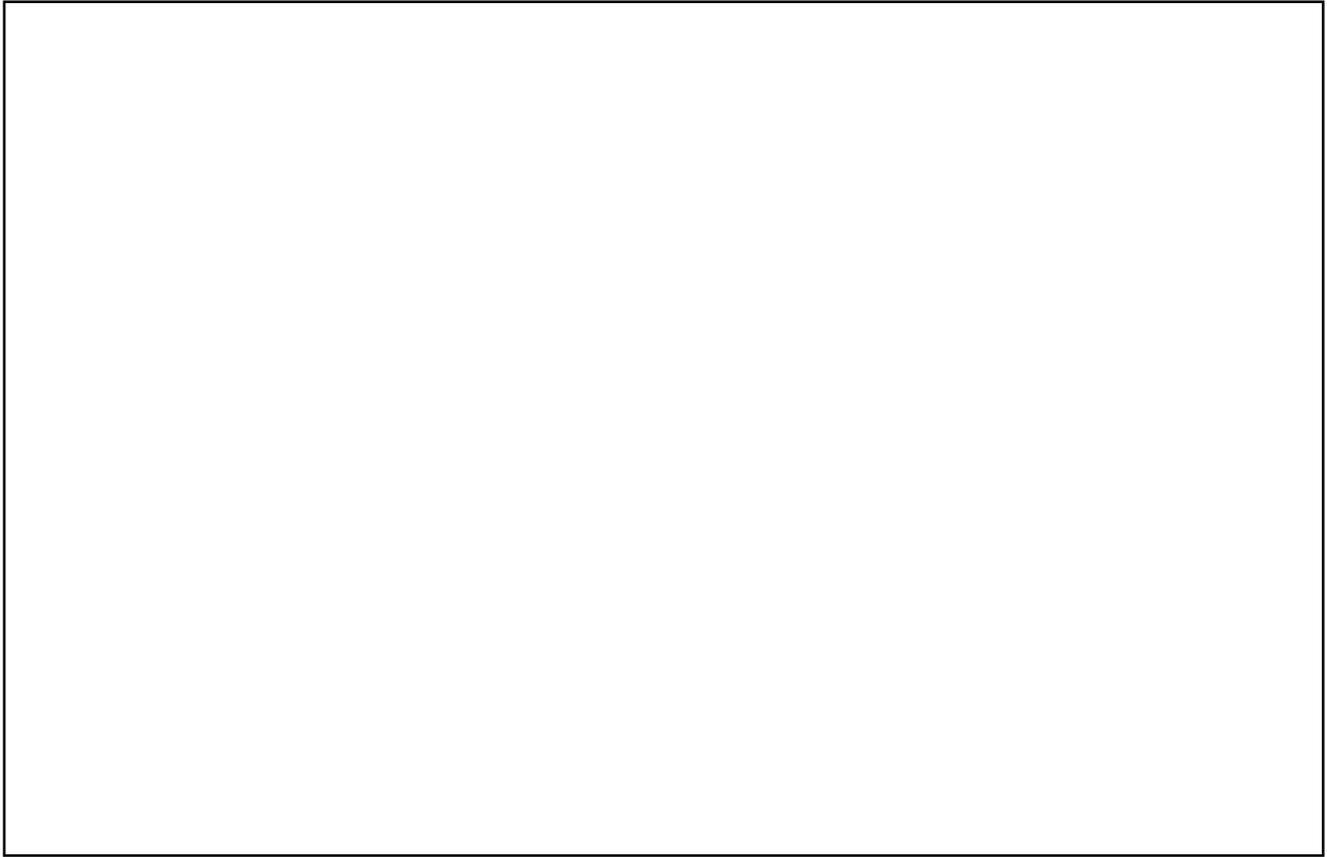
Part C:

Table 3 - Internal Anatomy of the Frog

Contents of stomach	Length of small intestines (cm)	Length of frog (cm)

Name: _____ Homeroom: _____

Sketch of the internal organs of the frog. May include actual picture of the frog's mouth. Label liver, heart, lungs, gallbladder, stomach, small intestine, large intestine, and esophagus.



Conclusion:

1. Was your frog male or female? What features of the frog helped you determine the sex of your frog?
2. What was the class average length of the frogs?
3. Describe the function of the following parts: tympanic membrane, Eustachian tubes, glottis, liver, heart, lungs, gallbladder, stomach, small intestine, large intestine, kidneys, testes, oviducts, and bladder.
4. Which was longer, the frog or its small intestine?