Honors Biology
Unit 6: Anatomy & Physiology

**Due Thursday April 21st!**
**Worth 15 lab points (including 5 cleanup points!)**

Name: _____ Period: _____

# Frog Dissection

## Introduction:

As members of the class Amphibia, frogs may live some of their adult lives on land, but they must return to water to reproduce. Frogs are more complex than Perch, but not as complex as mammals. Amphibians have a three chambered heart as well as lungs for the respiratory system. Frogs can also exchange gases and some nutrients through their skin, which must stay moist for this function. Complete the following lab procedures to investigate the anatomy of the common grass frog.

## Materials:

Forceps
Scalpels
Dissection needles
Scissors
T-Pins
Ruler
Dissecting Tray

## Specimen:

Common grass frog (preserved)

## Day 1:

For the first day, you will complete an examination of the external anatomy, anatomy of the mouth, observation of frog skin under the microscope, and the initial dissection to observe the internal anatomy.

## External Anatomy

Check the boxes and answer questions as you complete the following:

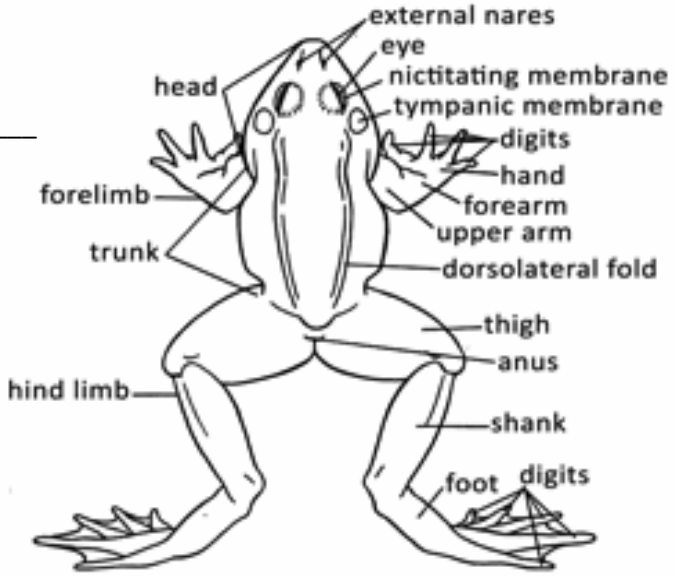
☐ Observe the dorsal (back) and ventral (belly) sides of the frog. Dorsal side color _____
Ventral side color _____

☐ Examine the hind legs.
How many toes are present on each foot? _____
Are the toes webbed? _____

☐ Examine the forelegs. How many toes are present? _____
Are the toes webbed? _____

☐ 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)
Frog length in cm _____

☐ Locate the frog's eyes, the nictitating membrane is a clear membrane that attached to the bottom of the eye. Use forceps to carefully remove the nictitating membrane. You may also remove the eyeball.
What color is the nictitating membrane? _____
What color is the eyeball? _____




☐ 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.
Diameter of tympanic membrane _____cm

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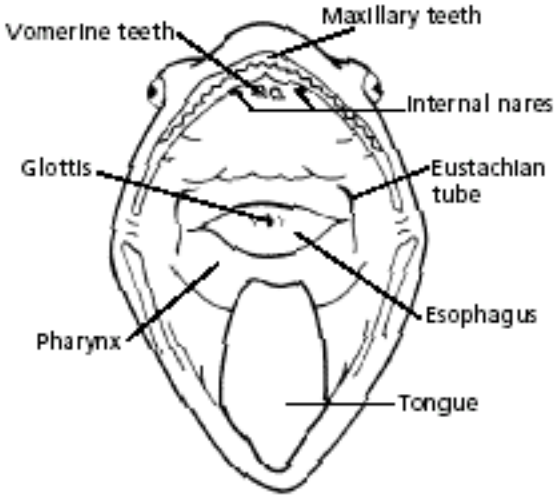
- ☐ Feel the frog's skin. Describe its texture:

  _____

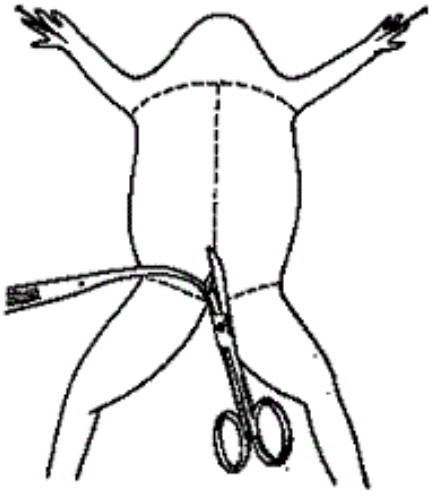
- ☐ Observe the microscope slide of the frog's skin.
  Draw your observation in the circle:

## Mouth Anatomy

1. Pry the frog's mouth open and use scissors to cut the angles of the frog's jaws open.
2. Cut deeply enough so that the frog's mouth opens wide enough to view the structures inside.




- ☐ Locate the tongue. Does it attach to the front or the back of the mouth? _____
  Does your tongue attach to the front or the back of your mouth? _____
- ☐ 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.
- ☐ 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. Insert a probe into the Eustachian tube.
  To what structure does the Eustachian tube attach? _____
- ☐ 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. Use your probe to open the glottis and compare that opening to the esophagus.
- ☐ The frog has two sets of teeth. The vomerine 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. Run you finger over both sets of teeth and note the differences between them.
- ☐ On the roof of the mouth, you will find the two tiny openings of the nostrils, if you put your probe into those openings, you will find they exit on the outside of the frog.



## Internal Anatomy:

1. Your frog should be ventral. Pin the forelimbs and hind limbs down to dissection tray (angle the pins so they are deep in the wax to firmly secure the limbs).
2. Use the diagram above to initiate dissection. Make a small puncture into the lower part of the abdomen near the pelvis. Then use the scissors to cut straight up the middle, careful not to cut any internal organs underneath. You should cut through two layers of tissue: the skin and the abdominal muscles.

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3. Again using scissors, cut vertical from forelimb to forelimb. Do the same from hind limb to hind limb. Make the cuts around the trunk of the frog almost to the back to allow for the skin flaps to easily open.
4. Splay open the flaps of skin and muscle and pin them down (use 1 pin in each corner, four total).

☐ **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.

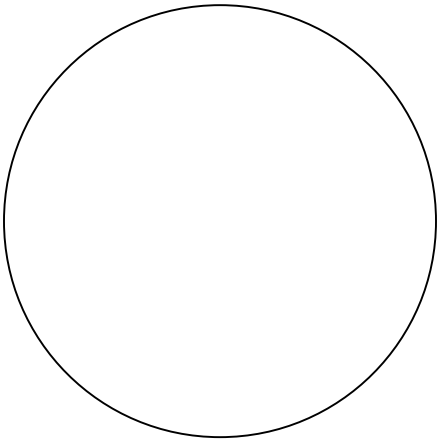
Describe the texture of the fat bodies _____

☐ **Peritoneum** - A spider web like membrane that covers many of the organs, you may have to carefully pick it off to get a clear view

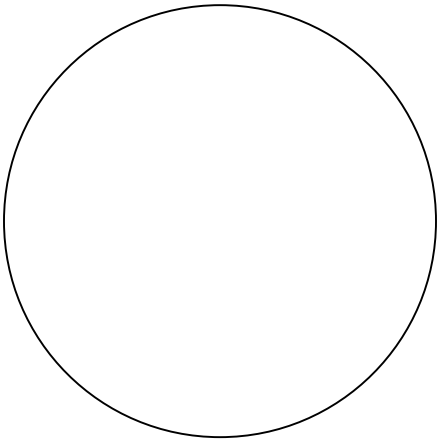
☐ **Oviducts -** Females do not have testes, though you may see a curly-q type structure around the outside of the kidney, these are the oviducts. Oviducts are where eggs are produced. The oviducts may be filled with small black eggs. Carefully remove these from your frog. A male frog will not have these structures.

Is your frog male or female? _____

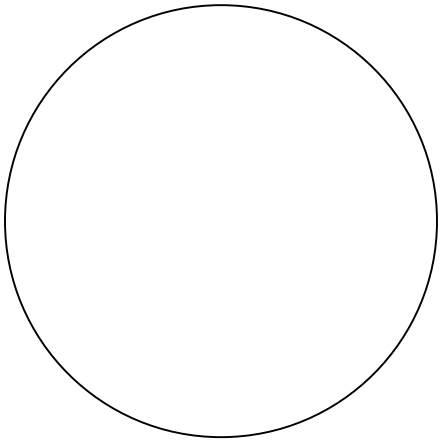
**Observe the following under the microscopes:**
**(Can be done day 1 or day 2)**



**Small Intestine**



**Heart Tissue**



**Lung Tissue**

**Why would lung tissue have the appearance of being "holey" while the heart tissue is dense and fibrous? (Hint: think about the function of these two tissues in the body!) (Answer in 2-3 complete sentences)**

**STOP HERE!** **Carefully unpin your frog and fold skin back over internal organs. Carefully store frog in provided plastic bag. Make sure air is pressed out of the bag and bag is sealed completely to keep your frog moist. Dispose of the oviducts (if female) and fat bodies.**

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## Day 2:

For the first day, you will complete an examination of the external anatomy, anatomy of the mouth, observation of frog skin under the microscope, and the initial dissection to observe the internal anatomy.

## Internal Anatomy - Continued

- ☐ **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 arteriosis**.
- ☐ **Lungs** - Locate the lungs by looking underneath and behind the heart and liver. They are two spongy organs.
- ☐ **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.
  **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. Describe the texture of the inside of the stomach
  Describe the contents of the stomach
- ☐ **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)
- ☐ **Spleen**--Return to the folds of the mesentery, this dark red spherical object serves as a holding area for blood.
- ☐ **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.
- ☐ **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. Often the top of the kidneys have yellowish stringy fat bodies attached.
- ☐ **Testes –** If your frog is male, the testes are located at the top of the kidneys, they are pale colored and roundish.
- ☐ **Bladder** - An empty sac located at the lowest part of the body cavity. The bladder stores urine.
- ☐ **Cloaca** - mentioned again as part of the urogenital system - urine, sperm and eggs exit here.

**Be sure to dispose of your specimen and clean up as indicated!**