NAME: ___________________________________ DUE DATE:__________________

FROG DISSECTION LAB MANUAL

PRE-LAB	20 PTS
LAB SKILLS	18 PTS
POST-LAB	30 PTS
TOTAL	68 PTS

MATERIALS

GLOVES
FORCEPS
PROBE
DISSECTING TRAY
SCALPEL
DISSECTING PINS
PRESERVED FROG
DISSECTING SCISSORS

PRE-LAB

Before conducting this experiment, there are a few key words we need to outline:

1. Dorsal –
2. Ventral –
3. Lateral -
4. Median –
5. Anterior –
6. Posterior –

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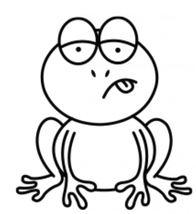
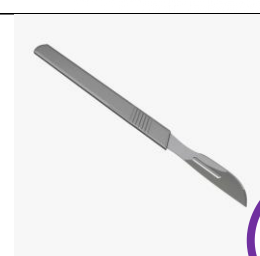
It is also important to review the tools we will be using; match the names of the tools to their picture:

FORCEPS	
SCALPEL	
PROBE	
PINS	
FROG	

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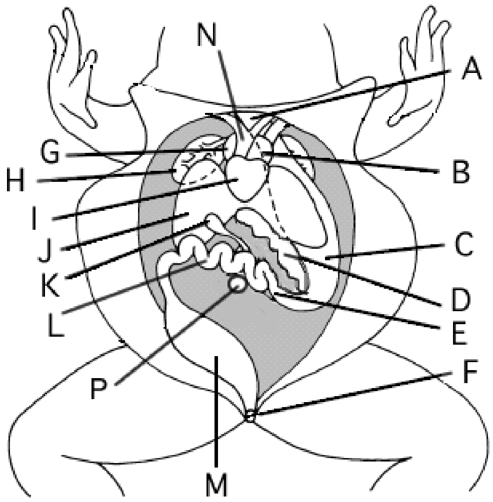
MATCHING HUMAN DIGESTIVE SYSTEM TO THE FROGS



A. ______________________________
B. __________left atrium__________
C. ______________________________
D. ______________________________
E. ______________________________
F. ______________________________
G. __________right atrium__________
H. __________lung__________
I. __________ventricle__________
J. ______________________________
K. ______________________________
L. ______________________________
M. ______________________________
N. __________**heart**__________

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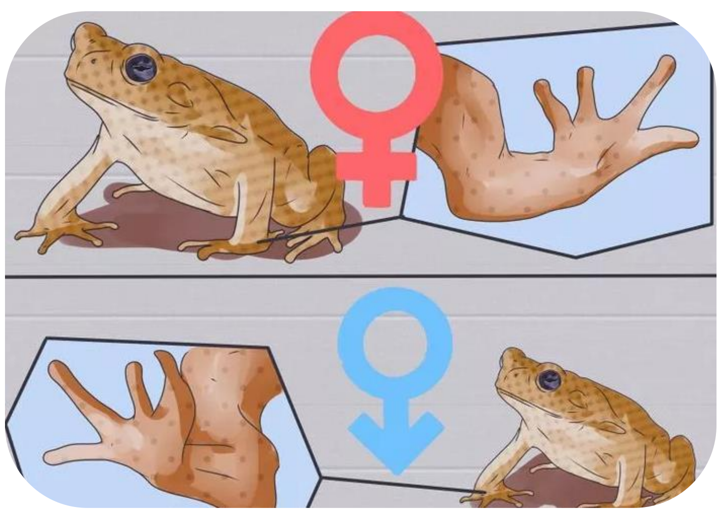
MALE OR FEMALE FROG?



The easiest way to quickly tell the difference between male and female frogs is to look at the feet. The front feet of male frogs should have a fatter thumb pad, and the thumb should look bulbous and fatter than the thin fingers of the female frog.

- If the specimen is female, keep an eye out for eggs and enlarged ovaries, which may need to be removed before you can identify certain organs.

LAB SKILLS

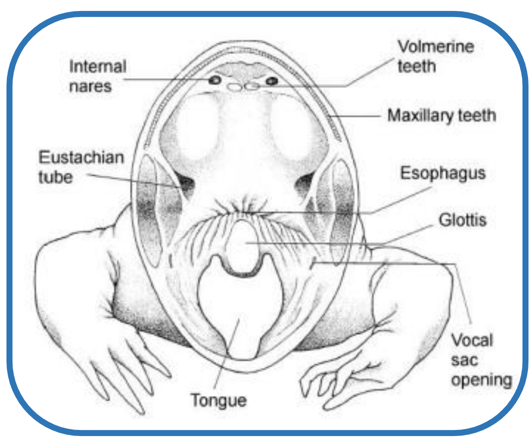
THE MOUTH

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

1. Locate the **tongue**. Does it attach to the front or the back of the mouth? Does it differ to a human tongue? Why or why not?
2. In the center of the mouth, toward the back is a single round opening, the **esophagus**. This tube leads to the stomach. Use a probe to poke into the esophagus.
3. 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.
4. 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). 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.
5. 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.
6. 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.

Complete the table.

STRUCTURE	FUNCTION
Vomerine Teeth	
Eustachian Tubes	
Esophagus	
Glottis	
Tongue	



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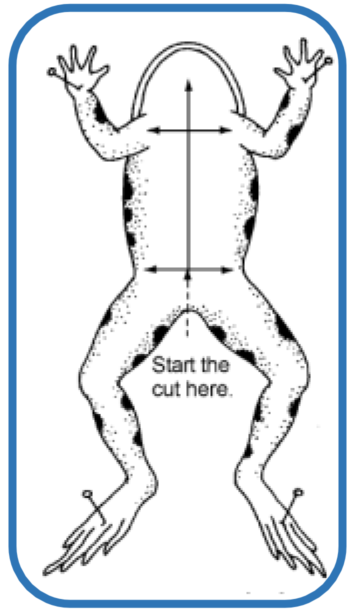
OPENING THE FROG



1. Place the frog ventral side up (on its back) and pin its four limbs down

2. Lift the frog's skin with forceps between the rear legs.

3. Make a small cut through the lifted skin with the scalpel. Take care to cut only the skin. You are making a starting place for the scissors.

4. Use the scissors to continue the incision up to the midline all the way through the frog's skin. Stop cutting when your scissors reach the frog's neck.

5. Now, you will cut horizontally. Use the scissors to make sideways incisions in the skin. The first incisions are made between the front legs. Then do the same with the rear legs. <u>Be careful to cut only skin, not muscle.</u>

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

7. Use a scalpel to help separate the skin from the muscle layer below. Then pin the skin to the dissection tray.

Cutting the Muscle and Bone:

1. Do the same 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. Use the scissors to continue the incision up the middle to just below the front legs. Don't cut too deeply, the muscle is thin. It is easy to damage the organs underneath. Cutting the bone:

4. 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. Stop cutting when you reach the frog's neck.

5. Make the horizontal (sideways) incisions, just as you did with the skin using the scalpel. The first incision is between the front legs, the second is between the rear legs.

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

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

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

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IDENTIFYING THE FROG DIGESTIVE TRACT

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

Locate each of the organs below in this order. Check the box to indicate that you found the organs.

1. 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. ❑
2. Peritoneum A spider-web like membrane that covers many of the organs; you may carefully pick it off to get a clear view ❑
3. Liver--The largest structure of the body cavity. This brown colored organ is composed of three lobes. The **right lobe**, the **left anterior lobe**, and the **left posterior lobe**. The liver secretes a digestive juice called bile. Bile is needed for the proper digestion of fats. ❑
4. 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) ❑
5. 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**.❑
THE NEXT ORGANS WILL BE EASIER TO SEE IF YOU REMOVE THE LIVER The liver is easier to remove if you remove the gall bladder and heart. Put to the side, but still on the tray.
6. Lungs - Locate the lungs by looking underneath and behind the heart and liver. They are two spongy organs. ❑
7. 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.❑
8. 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 frogs mouth and find the esophagus, poke your probe into it and see where it leads. ❑
9. 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.❑

10. Large Intestine--As you follow the small intestine down, it will widen into the large intestine. The large intestine leads to the cloaca, which is the last stop before solid wastes, sperm, eggs, and urine exit the frog's body. (The word "cloaca" means sewer) ❑
11. Pancreas - You can't see the pancreas without lifting the stomach and intestines with the forceps. The pancreas is a thin, yellowish ribbon. ❑
To see layer four, you need to remove the stomach, small intestine, large intestine, and pancreas. Place on the tray.
12. Spleen--Return to the folds of the mesentery, this dark red spherical object serves as a holding area for blood. It is a little more difficult to find the spleen in a female frog ❑
13. **Kidneys -** The kidneys are elongated, brownish colored organs found in the lower part of the frog's abdomen. Female kidneys are in the same place but can only be seen after removal of the ovaries and oviducts. ❑

Correct Identification of Digestive System Structures?

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Ms. Burns will cycle around and ask you to point out 5 structures.

ORGAN REMOVAL

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. What did you find in the stomach?

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 below in centimeters.

FROG LENGTH: _______________ CM

SMALL INTESTINE LENGTH ___________________ CM

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POST-LAB

1. Did you have a male or female frog? How did you identify this fact? (be specific as to how you can tell the difference) **[2 PTs]**

2. Where is the frog's liver and what it the purpose of this structure? **[2 PTs]**

4. How does the length of the small intestine relate to its function in absorbing digested food? **[2 PTs]**

5. Where is the **mesentery** located and what is its purpose? **[2 PTs]**

6. Sequence (explain, in order) the passage of food in the frog from the time it swallows a bug to the time it expels its remains. **[6 PTs]**

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7. Which organ stores bile? Where is it located? **[2 PTs]**

8. Which is the largest organ in the frog? What is its function? **[2 PTs]**

9. The membrane which covers the organs is called the: ___________________________________. **[1 PT]**

10. What is the colour of the spleen?____ **[1 PT]**

11. What are the three major structures involved in **chemical** digestion? What fluid do they each produce? **[3 PTs]**

12. These digestive fluids are made up of enzymes which catalyse digestion. Draw a simplified diagram of an enzyme, substrate and active site (make sure to label the three sections). **[3 PTs]**

13. What are four factors which affect the reactions of enzymes? Explain the relationship between the speed of reaction and each factor. **[4 PTs]**

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