

# Frog Anatomy

## External & Mouth

Nostrils  
Nictitating membrane  
Tympanic membrane  
Eustachian tubes  
Maxillary teeth  
Vomerine teeth  
Eustachian Tubes  
Esophagus  
Glottis  
Tongue

## Digestive System

Small intestine  
-- duodenum  
-- ileum  
-- mesentery  
Large intestine  
Cloaca

Liver  
-- right lobe  
-- left anterior lobe  
-- left posterior lobe  
Gallbladder  
--bile duct

Pancreas  
Fat bodies  
Peritoneum  
Esophagus  
Stomach  
--Pyloric sphincter valve  
--Rugae

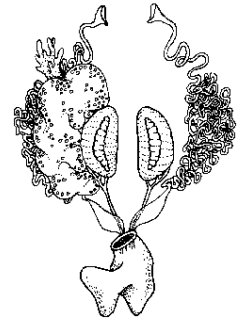
## Respiratory System

Glottis  
Lungs



## Urogenital System

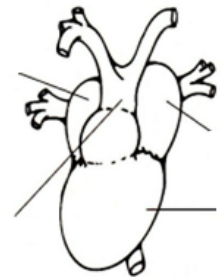
Kidneys  
Urinary duct  
Urinary bladder  
Cloaca  
Testes  
Oviducts / Eggs



\*Identify male and female frogs

## Circulatory System

Heart  
-- left atrium / right atrium  
-- ventricle  
-- vena cava  
-- conus arteriosus



Spleen

## Nervous System

Brain (identify on picture)  
--cerebrum  
--cerebellum  
--olfactory lobe  
--optic lobe  
-- medulla oblongata

## Skeletal System

Femur  
Tibiofibula  
Tarsals / Metatarsals  
Phalanges



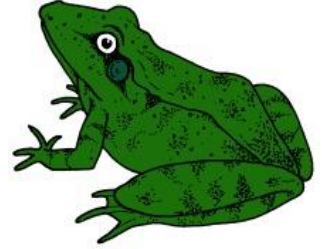
- ☐ Locate each of the structures
- ☐ Know their functions
- ☐ Know the systems

\*Bio 2A - test is fill in blank

\*Bio 2 - test is multiple choice

Name: \_\_\_\_\_ Period \_\_\_\_\_

## Frog Dissection: External Anatomy



1. Observe the dorsal and ventral sides of the frog. ☐ How do they differ in color?

Dorsal side color \_\_\_\_\_ Ventral side color \_\_\_\_\_

What is the name of this adaptation? \_\_\_\_\_

2. Examine the hind legs. ☐

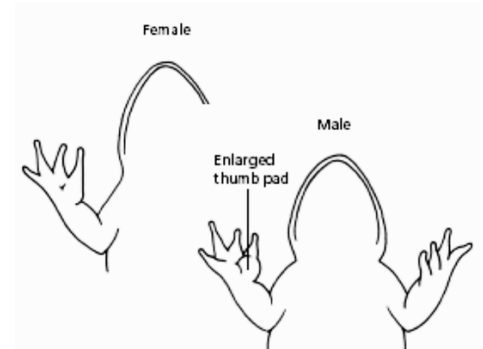
How many toes are present on one foot? \_\_\_\_\_ Are the toes webbed? \_\_\_\_\_

3. Examine the forelegs. ☐

How many toes are present on one foot? \_\_\_\_\_ Are the toes webbed? \_\_\_\_\_

4. To determine the frog's sex, look at the forelimb digits. A male frog may have thick pads on its "thumbs," which is one external difference between the sexes, as shown on the diagram. Observe several frogs to see the differences between males and females. ☐

Is your frog male or female? \_\_\_\_\_



4. 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). Compare the length of your frog to other frogs

Your Frog (length in cm)	Frog 2	Frog 3	Frog 4	Frog 5	Average Length

5. Locate the frog's eyes. The frog has three eyelids. The 2 outer ones are the color of the frog's body. They do not move. Locate the third eyelid. It is a transparent membrane that protects the eye while permitting the frog to see underwater. It is called the **nictitating membrane**. 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? \_\_\_\_\_

6. 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

7. Feel the frog's skin. Is it scaly or is it slimy? \_\_\_\_\_ ☐

## Anatomy of the Frog's Mouth

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

1. Locate the **tongue**. Play with the tongue.

Does it attach to the front or the back of the mouth? \_\_\_\_\_ (You may remove the tongue) ☐

2. 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. ☐

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. ☐

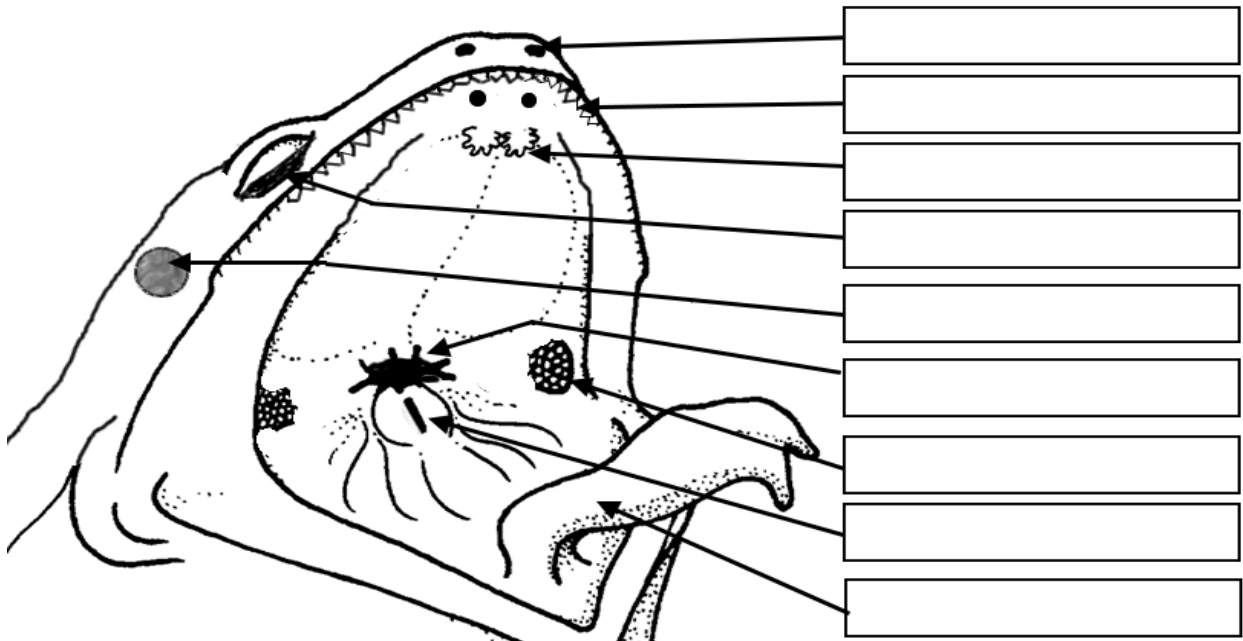
Insert a probe into the Eustachian tube. To what structure does the Eustachian tube attach? \_\_\_\_\_ ☐

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 up). This slit is the **glottis**, and it is the opening to the lungs. The frog breathes and vocalizes with the glottis. ☐

5. The frog has two sets of teeth. The **vomerine teeth** are found on the roof of the mouth and the **maxillary teeth** are found around the edge. Both are used for holding prey, frogs swallow their meals whole and do NOT chew. ☐

6. 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**. ☐

7. Label each of the structures underlined above on the frog's mouth and complete the table.



Structure	Function	Location
Vomerine teeth		
Eustachian tubes		
Nictitating Membrane		
Tympanic Membrane		
Esophagus		
Glottis		

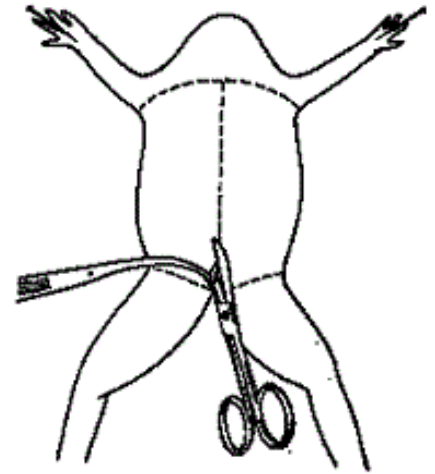
## Frog Dissection: Internal Anatomy (Day 2)

### Dissection Instructions

1. Place the frog in the dissecting pan ventral side up.
2. Use scissors to lift the abdominal muscles away from the body cavity.  
Cut along the midline of the body to the forelimbs.

3. Make transverse (horizontal) cuts near the arms and legs.
4. Lift the flaps of the body wall and pin back.

\*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. Check the box to indicate that you found the organs. ☐

1. **Fat Bodies** --Spaghetti-shaped structures that have a bright yellow-orange color; 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, most easily seen covering the heart. ☐
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 which is needed for the digestion of fats. ☐
4. **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**. ☐
5. **Lungs** - Locate the two spongy lungs by looking behind the heart and liver. . ☐
6. **Gallbladder** --Lift the lobes of the liver, there will be a small green sac under the liver. This is the gallbladder, which stores bile. (hint: it kind of looks like a booger) ☐
7. **Stomach**--Curving from underneath the liver is the stomach. The stomach is the first major site of chemical digestion. Frogs swallow their food 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. **Pancreas** - This structure is located on the inside curve of the stomach. It is a gland that often falls apart during the preserving process so it may not be visible on your frog. It secretes insulin and other hormones.
9. **Small Intestine**-- The stomach leads to the small intestine. 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). The opening to the outside of the body is the **anus**. ☐

**11. Spleen**--Return to the folds of the mesentery, this dark red spherical object serves as a holding area for blood. ☐

**12. 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 section!\*\*\***

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## Removal of the Stomach and Intestine and Heart

Cut the stomach out of the frog and open it up. You may find what remains of the frog's last meal there. Look at the texture of the stomach on the inside. ☐

What did you find in the stomach? \_\_\_\_\_

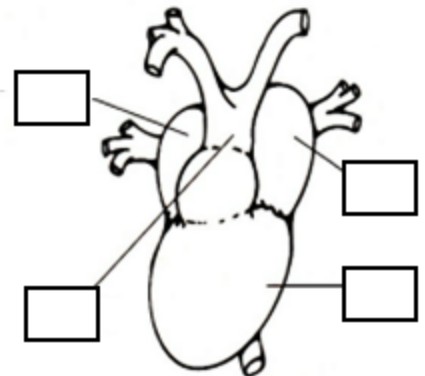
Measuring the Small intestine: Remove the small intestine from the body cavity and carefully separate **the mesentery** from it. Stretch the small intestine out and measure it. Now measure your frog. Record the measurements below in centimeters.

Frog length: \_\_\_\_\_ cm      Intestine length \_\_\_\_\_ cm ☐

**Removal of the Heart** - Carefully cut out the heart from its position above the liver. You will need to remove the peritoneum (in the heart it is specifically called the **pericardium**). The frog's heart has 3 chambers, the **left and right atrium**, and the **ventricle**.

The vessel on the front of the heart is the **conus arteriosus**, which sends blood to the body. On the back you can find the openings for the anterior and posterior **vena cava**, which return blood to the heart.

- Label the heart. ☐
- left atrium (LA)
  - right atrium (RA)
  - ventricle (V)
  - conus arteriosus (CA)



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**Urogenital System** - The frog's reproductive and excretory system are combined into one system called the urogenital system. You will need to know the structures for both the male and female frog

**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 waste from the blood. Often the top of the kidneys have yellowish stringy **fat bodies** attached. ☐

**Testes** - in male frogs, these organs are located at the top of the kidneys, they are pale colored and round. ☐

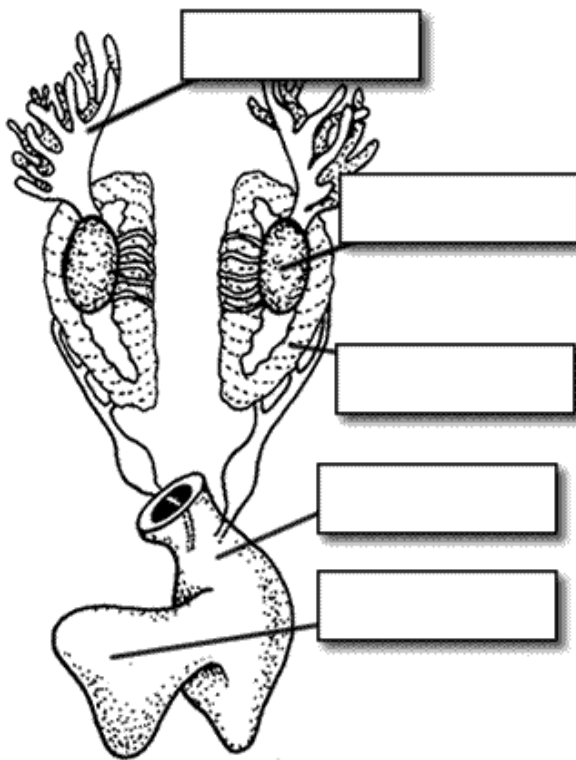
**Oviducts** - females do not have testes, though you may see a curly structure around the outside of the kidney, these are the oviducts. Oviducts are where **eggs** are produced. Males can have structures that look similar, but serve no actual purpose. In males, they are called vestigial oviducts. ☐

**Bladder** - An empty sac located at the lowest part of the body cavity. The bladder stores urine. ☐

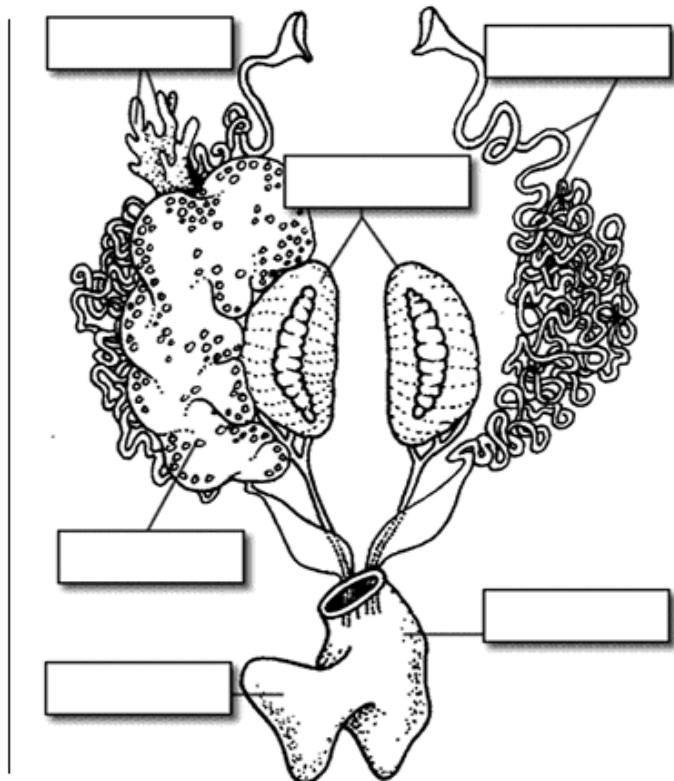
**Cloaca** - mentioned again as part of the urogenital system - urine, sperm and eggs exit here. ☐

Label the parts of the urogenital system.

Label the structures of the urogenital system in the male and female frog. ☐



MALE



FEMALE

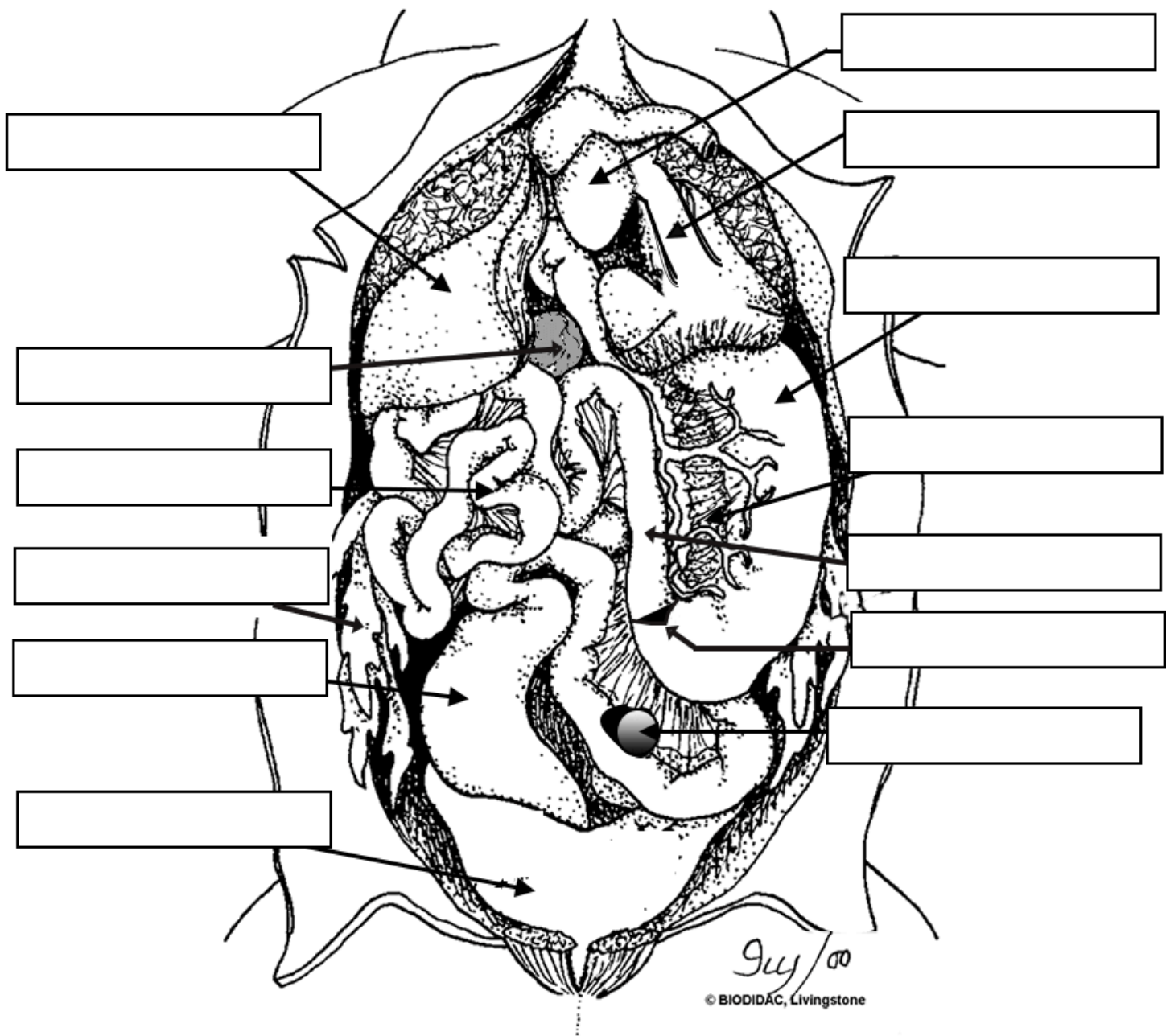
## Post Lab Questions

1. The membrane holds the coils of the small intestine together: \_\_\_\_\_
2. This organ is found under the liver, it stores bile: \_\_\_\_\_
3. Name the 3 lobes of the liver: \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
4. The organ that is the first major site of chemical digestion: \_\_\_\_\_
5. Eggs, sperm, urine and wastes all empty into this structure: \_\_\_\_\_
6. The small intestine leads to the: \_\_\_\_\_
7. The esophagus leads to the: \_\_\_\_\_



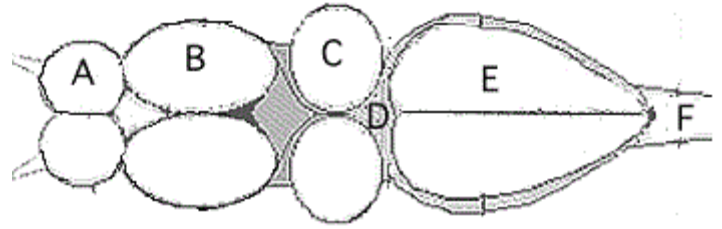
8. Yellowish structures that serve as an energy reserve: \_\_\_\_\_
9. The first part of the small intestine(straight part): \_\_\_\_\_
10. After food passes through the stomach it enters the: \_\_\_\_\_
11. A web-like membrane that covers the organs: \_\_\_\_\_
12. Regulates the exit of partially digested food from the stomach: \_\_\_\_\_
13. The digestive system ends at the opening called the: \_\_\_\_\_
14. Organ found within the mesentery that stores blood: \_\_\_\_\_
15. The largest organ in the body cavity: \_\_\_\_\_

**Label the Diagram** (use bold words throughout this handout)



## Study and Removal of the Frog's Brain

Starting at the most anterior part of the head, the olfactory nerves connect to the nostrils and then to the **olfactory lobes** (A) where odors are processed. Just posterior to the **olfactory lobes** are two oval structures, the **cerebrum** (B), and it is the frog's thinking center.



Posterior to the cerebrum are the **optic lobes** (C), which function in vision. The ridge just behind the optic lobes is the **cerebellum** (D), it is used to coordinate the frog's muscles and maintain balance. Posterior to the cerebellum is the **medulla oblongata** (E) which connects the brain to the **spinal cord** (F).

Complete the chart: ☐

Brain Part	Function	Letter
Cerebellum		
Cerebrum		
Olfactory Lobe		
Optic Lobe		
Medulla Oblongata		

**Removal of the Frog's Brain:** Turn the frog dorsal side up. Cut away the skin and flesh on the head from the nose to the base of the skull. With a scalpel, scrape the top of the skull until the bone is thin and flexible. Be sure to scrape AWAY from you. Carefully chip away the roof of the skull to expose the brain and remove it. ☐

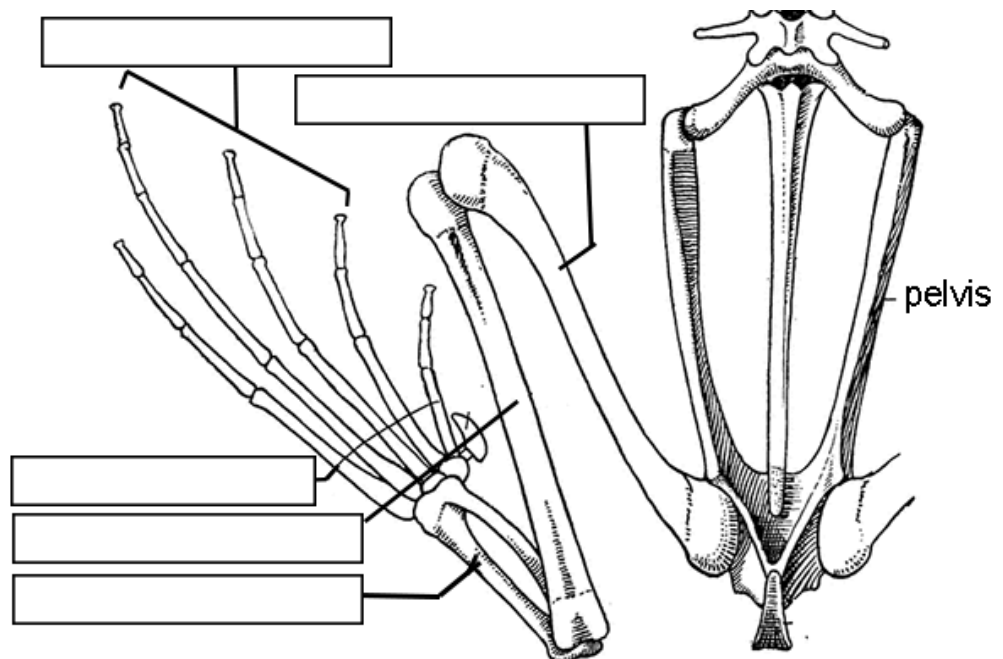
## FROG BONES

The **femur** is found in the upper thigh, and the **tibiofibula** is found in the lower part of the leg.

The **tarsals** make up the ankle. The foot contains the **metatarsals** and then the smaller **phalanges** of the toes.

Expose the frog's leg bones by removing the thigh muscle - the **biceps femoris** and the calf muscle - the **gastrocnemius**. ☐

You can leave the **Achilles tendon** intact (this connects the muscle to the bone).



Label the bones on the diagram. ☐