STUDENT LABORATORY — Frog Dissection Internal Part II

Grade (Out of 20): [ ] [ ] Lab Credits: [ ]

Full Name: __________________________ Lab Date: __________
Lab Section: _______ Lab Instructor: _______________________ Credit: 1 lab period

Standards:
- Common Core Standards: Reading: 3,4,5,7
- Living Environment Core Curriculum Standards: Dissect plant and/or animal specimens to expose and identify structures

Objectives:
To investigate how the internal structures of a frog adapt it to life on land and water.
To compare body systems of a frog to those of a human.

LABORATORY EXERCISE

*Note — This lab is due at the end of the lab period or as directed by your instructor. Your instructor may modify the lab based on time.

Pre-lab: [ ] (7 pts.)

1. What is the purpose of the fat bodies? Why are these structures important to the frog?

2. What is the secretion of the gall bladder? What is its role in digestion?

3. Name the thin tissue that holds the organs in place in the body cavity.

4. Label the diagram of the reproductive and excretory systems of a male (left) and female (right) frog: **Word bank:** fat bodies, kidneys, ureters, cloaca, testis, oviduct.
Internal Anatomy of the Frog
Materials and Equipment:
Preserved frog, Dissecting tray, Gloves, Scissors, Forceps, Blunt probe, Dissecting needle, Dissecting pins, Hand-lens, Ruler, Lamp (optional).

Procedure: □ (9 pts.)

Getting started:
Follow your instructor’s directions on how to handle your frog. Keep your frog in the dissecting pan at all times. Do not walk around the lab room with your frog. All students touching the frog must wear gloves. Place only one set of hands on the frog when using sharp instruments. All cuts are made in a direction away from you. When finished with the lab, all group members are responsible for cleanup. Finally, handle the frogs carefully and respectfully; it was once a living organism.

*Note — Check the box □ when you complete a step. Suggestion – have one student be the reader. He/she should read the procedure aloud. Remember to record your observations and answers on this sheet. Also, you will be removing organs from the frog and placing them on a dissection sheet to be viewed and grades by your lab instructor. Follow the directions as you proceed through the dissection and refer to your diagrams.

1. □ Get a tray, tools and your group’s frog from your lab instructor. Place the frog on the dissecting tray with the ventral side facing up and the anterior end pointing away from you. Remove the rubberband and open the flaps of skin and muscle to reveal the internal organs of the frog. Place dissecting pins at an angle of 45 degrees to keep the body cavity open as wide as possible.

2. □ Fat bodies: When food is abundant, the frog stores extra calories in the form of fat bodies. When food is scarce, or during hibernation, the fat bodies provide energy for life processes. They provide energy once again for the production of eggs and sperm in the spring breeding season. Observe the yellow, finger-shaped fat bodies. In the frog, the fat bodies will be more visible when you do the urinary tract examination. Remove them and place them on your group’s dissection sheet. This sheet is to be signed by your teacher at the end of lab.

   About how long is an average fat body in your frog (measure in mm)? ____

   Observe the fat bodies from other groups. Based on the relative size of your frog’s fat bodies, during what season do you think your frog was caught? Why?

3. □ Liver: Find the dark brown liver compose of three to five lobes. Attached to the underside of the liver, between the rightmost lobe and the adjacent lobe is the transparent gall bladder. Using your blunt probe and tweezers, examine the bile duct that connects the gall bladder with the first part of the small intestine (duodenum). Carefully remove the liver and gall bladder (but leave the intestines intact). Place the liver and gall bladder on the dissection sheet in one piece.

   How many lobes does your frog’s liver have? ____

4. □ The stomach is a C-shaped bag under the liver. The anterior end of the stomach is connected to the esophagus, while the posterior end is connected to the small intestine (do not remove the stomach at this time).
5. The **pancreas**, is feather-shaped organ located just dorsal to the stomach and attached to the bile duct by a small tube, the pancreatic duct. Locate and observe it (*Note — The pancreas can be challenging to find).

6. The **small intestines** appear as a long coiled tube of small diameter. Trace the small intestine toward the posterior of the frog using the blunt probe. Be careful not to tear any tissue. The small intestine joins the much shorter but wider **large intestine**.

7. Just anterior to the **anus**, and located between the hind legs, the large intestine is joined by the **urinary bladder**, a two-lobed, thin-walled sac that may be lying on top of to one side of the large intestine.

8. **Remove the entire alimentary canal** (digestive system) in one long piece including: the esophagus, the stomach, small intestine and large intestine. Place it on the sheet.

9. The **small intestine** (which you already removed) is twisted into a helical form by the **mesentery** (a thin, fan-shaped membrane). Carefully loosen and cut the membrane (*Note — this can be difficult and requires a gentle touch and patience). Notice how long the small intestine is once it is unwound. Note the relative size of the stomach and the length of the small intestine. The **spleen** is visible as a pea-sized, dark-red sphere attached to the mesentery between the stomach and the large intestine.

10. Carefully cut the **stomach** open lengthwise, and the large intestine. Examine the contents using the hand lens.

   *Describe the contents of the stomach and/or large intestine.*

11. Urine is produced in the **kidneys**. Urine passes through tubes to the cloaca where it can be released or stored temporarily in the bladder. The frog can use urination as a defense mechanism (if you have ever picked up a frog you may already know this!). Locate the flat, dark reddish-brown kidneys deep in the abdominal cavity up against each side of the backbone.

12. In **male** frogs each yellowish, oval-shaped **testis** sits on the ventral surface of each kidney. The **testes** are attached to the kidneys by tubes. Interestingly, in many species of frogs, males have **vestigial** (*structures in an organism that have lost their original function, but have been retained through evolution*) **oviducts** attached to the cloaca called **Mullerian tubes**.

13. In **female** frogs the two **ovaries** appear as egg sacs. Eggs released from the ovaries enter a long, coiled, cream-colored **oviduct** near the lungs. Eggs pass down the oviduct in single file and are held in an **ovisac** before entering the cloaca where they are released. As they pass through the cloaca, the eggs are coated with a jellylike material that swells as they enter the water.

14. **During mating**, the male frog grasps the female using enlarged thumb-pads in an embrace called **amplexus**. The male releases sperm and the female eggs, from their respective cloacae at the same time into the water. The sperm fertilize the eggs externally.

   *Why do you think amplexus is an adaptation for externally fertilizing animals like the frog?*
15. □ **Remove** the kidneys and place them on your sheet. If your frog is male, remove the testes and Mullerian tubes if present, and place them on your sheet. If you frog is female, remove the oviducts and ovisacs and place them on your sheet (*Note — the ovisacs store the eggs and thus would have been removed during the previous lab if you removed your frog’s eggs).

16. □ **Have your teacher sign** the lab group dissection sheet.

17. □ **Congratulations**! You have completed part two of exploring the internal anatomy of the frog.

18. □ **Clean up!**
   
   a. □ Remove the pins from your frog
   
   b. □ Follow your lab teacher’s instructions on how to dispose of the frog.
   
   c. □ Get rid of any small frog pieces in your dissecting pan before rinsing it as to not clog the sink.
   
   d. □ Wash, rinse and dry your tools and tray.
   
   e. □ Spray and wipe your lab bench.
   
   f. □ Follow any other directions from your lab instructor for cleanup.

**Analysis Questions:**

**1.** Based on today’s lab, describe two examples of how frogs are adapted for life on land and/or water. Cite your observations.

*Note — Hand this lab in at the end of the lab period or as directed by your lab instructor.*