Name Period Date

Unit	Handout
1	37

Frog Dissection

Purpose:
- To observe the anatomy of an amphibian
- To discover characteristics of complex vertebrates
- To compare anatomy of the frog to that of other organisms
- To relate the physiological functions of the structures to the frog's anatomy

General Instructions

Read through the following procedure. When instructed, answer any questions or fill in any missing information. The answers and information may be found in your Animals book, your Life Science book, the frog dissection guide, and any other resources given to you. After some questions you will be told where the information can be found.

LS - Life Science book DG - Dissection Guide
The number indicates the page number.

Digital copies of these resources are available at *http://7bscience.com/frogs.html*. The password is room122.

Remember: the purpose of this lab is not just to find the answers. It is a chance for you to explore a complex vertebrate and apply what you have learned in biology.

Procedure

Background Information

1. Check your tray for your dissection supplies. You should have: 1 tray, 1 bag, 1 marker, 1 glove (per person handling the frog), 1 pair of goggles per person, 1 apron per person.
2. Other supplies are on your tray that you will not use today: scalpel handle, scissors, and dissecting needles. Remove these from the tray. If any of these materials are missing, please let Mr. Ower.
3. Label your bag with your period number and your names.
4. A frog is a type of animal called an amphibian. What is an amphibian? (LS 281)

   _____
5. (LS 281) Frogs have many characteristics that make them amphibians. For example, the skin of a frog is _____ . It has two pairs of _____. It's heart has _____ chambers. It can breathe with _____ when it is an adult. Oxygen can even pass through the thin _____ .
6. Amphibians are classified into two major groups: _____ (LS 281) Observe your frog. Which amphibian group does it belong to? _____

Limbs

7. Now you shall observe the other characteristics of the frog. First, notice that it has four legs; this makes it a tetrapod. What is the function of the hind limbs? (DG 1)

   _____

8. At the end of each limb you will observe digits (the "fingers" and "toes"). There are noticeable differences between digits on the forelimbs and hind limbs. For example, observe between the digits on the hand and compare them to the digits of the foot. What difference is there?_____

9. You should also observe a difference in the number of digits on each limb. The hand has _____ (#) digits and the foot has _____ (#) digits. (# = how many)

10. On the rear limb foot you should notice a reduced (smaller) digit above the other digits. This is known as the vestigial digit. (Geek note: what does vestigial mean?)

Skin Observations

11. Now you will observe the skin of the frog. As you learned, the skin is thin and moist to allow oxygen to easily pass into the organism. You should also observe that the frog has different skin patterns on its dorsal and ventral sides.
    a. Describe the skin pattern/color on the dorsal (back) side. _____
    _____
    b. Describe the skin pattern/color on the ventral (belly) side. _____
    _____

12. The dark spots you observed on the dorsal side are the result of pigment cells called _____ (DG 1).

13. Why does the frog have this skin pattern? _____
    _____

Head Observations (See DG 1 for most answers to this section.)

14. Now you will observe the frog's head. First, locate the eyes. Notice that the eyes are found on the side of its head. How does this affect how it sees?

    _____

15. The frog has three eyelids. There is a fleshy _____, a thinner _____, and there is a third eyelid known as the _____. The function of this third eyelid is _____
    _____

16. Behind the eye you should observe a large circle. This is known as the tympanum. What is the function of the tympanum? _____

17. At the front of the head you will observe two small, rounded openings. These are known as the external nares. What is the function of the external nares?

_____

Where do the external nares lead to? _____

Trunk

18. Turn the frog over so you can observe its ventral side. Notice that the frog does not have a neck. The head is attached directly to the trunk. Run your finger between the arms. You should feel a hard bone here. This is the _____. (DG 1)

19. Gently push on the ventral side of the frog below the sternum. You should observe that it is very soft and not well protected. This is because it lacks a _____ (DG 1)

20. Continue toward the posterior end of the frog. Here you will find an opening to the frog (you may not be able to see it). This opening is called the anus. Beyond it is a part you will observe later called the cloaca. What is the function of the cloaca? (DG 1) _____

_____

Sex Identification

21. It is possible, albeit somewhat difficult, to determine the sex of your frog without cutting it open. To determine the frog's sex, observe the following:

a. Males have a larger _____ (DG 2) on the first toe of each forelimb. This allows the frog to hold the female while mating.

b. Females have a smaller _____ (DG 2), located just behind the eye and about the same size as its eye, compared to the males.

22. Based on these observations, can you determine the sex of your frog? What do you think is your frog's sex? _____. Why? _____

_____

Diagram

23. Label the following parts:
anus, *external nares*, *mouth*, *upper eyelid*, *forelimb*, *nictitating membrane*, *hind limb*, and *chromatophores*.

Internal Anatomy

General Instructions

- Review the procedure given to you in class.
- **Do NOT use the procedure in the dissecting manual or the textbook!**
- Your incisions will be made on the ventral (belly) side.
- Only cut through the skin first. Then cut through the muscle. Do not push hard! You could cut the organs on the inside of the frog.
- Materials needed: 1 tray, 2 t-pins, 2 dissecting needles, 1 scalpel, 1 pair of goggles per person, 1 glove per person handling the frog, 1 pair of scissors, 1 pair of forceps.

Background Information

You will be making your incisions in the coelem. The coelem is the cavity that contains the organs. The coelem is divided into two sections: the thoracic, containing the heart and lungs; and the abdominal, containing the major digestive organs.

Follow the procedure for opening the frog as demonstrated in class. You can use DG 3 to help you, but follow the procedure from the class demonstration. Once you finish dissecting, continue below.

Thoracic Region

22. Just below the sternum, you will find the heart. The heart is covered by a thin membrane called the pericardium. Observe this membrane and peel it away.
    a. Observe the heart. How many chambers does it have? _____ (LS 281)
    b. What are the upper chambers called? _____ (LS 281)
    c. What is the lower chamber called? _____ (LS 281)
    d. Does the frog have an open or closed circulatory system? (*Hint: read pages 322-324, see diagram of frog on 325)*. _____
    How do you know? _____
    _____

23. Also in the thoracic region you will find the lungs. They will appear on either side of the heart toward the dorsal side of the frog.
    a. What is the function of the lungs? (LS 321) _____
    _____

Abdominal Region

24. Located in the anterior region of the abdomen is the large liver. It has three lobes and is dark green, brown, or red in color.
    a. What is the function of the liver? (LS 431) _____
    b. What is the function of bile? _____
25. Within the liver, you should observe a small, pea-shaped organ known as the gallbladder.
    a. What is the function of the gallbladder? (DG 4) _____
    b. What gives it its color? _____
26. Under the liver and on the frog's left side (your right), you should observe a tube leading from the mouth and to the stomach. This is the esophagus. Its terminal is a j-shaped organ called the stomach.
    a. What is the function of the stomach? _____
27. From the stomach you will see a smaller, bunched tube. This is the small intestine.
    a. What is the function of the small intestine? (LS 428) _____
    _____
28. You should notice thin membrane holding the small intestine in place. This is know as the mesentery. Its function is to hold the digestive tract and other organs in place. Attached to the mesentery you should find the spleen. It is spherical and red in color.
    a. What is the function of the spleen? (DG 4) _____
29. Observe the area between the small intestine and the stomach. You should see a flat, narrow, pinkish organ called the pancreas.
    a. What is the function of the pancreas? (LS 432) _____
    b. What is pancreatic juice? _____
30. Looking back to the small intestine, follow it from the stomach. It should terminate at a thicker and shorter tube. This is the large intestine.
    a. What is the function of the large intestine? (LS 429) _____
    _____
31. At the end of the intestine you should observe a large, soft sac. This is the cloaca. Recall its function (#18 on page 3 of this packet). Re-write its function here.
    _____
32. Raise your hand and obtain permission to open the cloaca. Record what you find in the cloaca here. _____

33. Now locate the reproductive organs of the frog.
    a. If you have a female, locate the ovaries with many black and white eggs and the oviduct, which is a coiled tube in which the eggs will pass through before being laid in water. You should also observe the yellow fat bodies.
    b. If it is male, it will have two whitish, bean-shaped testes in the same area as the ovaries in the female. Sperm ducts called vasa efferentia carry sperm to the cloaca.
    c. What is the confirmed sex of your frog? _____
34. The kidneys will be found in this region as well. They appear as a flat, reddish organ located dorsally on both sides of the spine.
    a. What is the function of the kidney? (LS 457) _____
    _____
35. The kidneys are drained by small tubes called ureters. Locate them as they lead posteriorly from the kidneys. They empty into a large holding sac called the urinary bladder. It is very thin-walled and empties into the cloaca.
    a. What three systems use the cloaca? (DG 4) _____
    _____

Great! You're done exploring the internal anatomy! Practice identifying the following organs. You should know **where they are** in the frog and **the function** of each.

External	Internal
•Chromatophore •Nictitating Membrane •Tympanum •External nares (nostrils) Know the different directions: * Ventral * Dorsal * Anterior * Posterior	•Heart •Gallbladder •Kidney •Large intestine •Small intestine •Liver •Lung •Spleen •Stomach •Cloaca •Pancreas