

Name: _____

Date: _____

Lab Partner(s) Name(s): _____

Lab # - DISSECTION LAB



Purpose:

- *Describe* the appearance of various organs found in the frog.
- *Name* the organs that make up various systems in the frog.

Materials:

preserved frog
safety goggles, apron, and gloves
tools tray
dissecting tray
scissors paper towels
dull probe
plastic storage bag
 marking pen

EQUIPMENT:

forceps
dissecting pins

probes
scalpel

SAFETY ALERT !

Use caution when working with sharp

objects

Clean up any spills immediately

Follow all directions carefully

Overall Procedure:

- 1.) Read through the background material on the frog and its anatomy
- 2.) Read the ENTIRE PROCEDURE for the day you are working on
- 3.) Follow all safety guidelines and wear appropriate safety protection
 - goggles
 - apron
 - gloves
- 4.) Follow the directions for the dissection, make sure you stop where it says to stop and do not proceed past that point
- 5.) Follow all clean-up directions according to your teacher's directions
- 6.) Answer the questions that follow to complete the lab report.

Background Information and Reading

As members of the **Amphibian** class, frogs may live some of their adult lives on land, but they must return to water to reproduce. Eggs are laid and fertilized in water. Their anatomy is much like ours with some differences made necessary by their life in the water.

External Anatomy:

You will look at the external anatomy on the first day of the dissection.

On the outside of the frog's head are two **nostrils**; two **eardrums**; and two eyes, each of which has two lids. The second lid, called the **nictitating membrane**, is transparent. Inside the mouth are the **teeth** at the sides of the mouth. Also inside the mouth behind the tongue is the **pharynx**, or throat. In the pharynx, there are several openings: one into the **esophagus**, the tube into which food is swallowed, which is the easiest to see. The other is the **glottis**, which leads to the lungs of the frog.

Internal Anatomy

When you open the chest and abdominal section of the frog you will begin to look at the internal organs. You will spend the next three days of your lab on this part of the activity. There are many organs to find.

The frog's skeletal and muscular systems consist of its framework of bones and joints, to which nearly all the voluntary muscles of the body are attached. **Voluntary muscles**, are those over which the frog has control. You will see the thin layer of muscles under the frog's skin when you first open the body for dissection.

The respiratory system consists of the nostrils and the glottis, which opens into two **lungs**, hollow sacs with thin walls. The circulatory system consists of the **heart**, blood vessels, and blood. Blood is carried to the heart in vessels called **veins**. Blood from the heart is pumped into the **arteries**, which are blood vessels that carry blood away from the heart.

The digestive system consists of the organs of the digestive tract, or food tube, and the digestive glands. From the esophagus, swallowed food moves into the **stomach** and then into the **small intestine**. Bile is a digestive juice made by the **liver**, a very large organ in the belly and stored in the **gallbladder**. The **pancreas** is found between the two sides of the liver and releases digestive juices. Indigestible materials pass through the **large intestine** and then into the **cloaca**, the common exit chamber of the digestive, excretory, and reproductive systems. You can also find the **spleen** which is part of the digestive and immune system.

The urinary system consists of the frog's kidneys, ureters, bladder, and cloaca. The **kidneys** are organs that clean blood and excrete urine. Connected to each kidney is a **ureter**, a tube through which urine passes into the **urinary bladder**, a sac that stores urine until it passes out of the body through the cloaca.

The organs of the male reproductive system are the **testes** and those of the female reproductive system are the **ovaries**. You will also find **fat bodies** that grow large and store food for when the frog hibernates. It is also possible that you will find **eggs** if your female was gravid, or pregnant, at the time of her death.

The nervous system of the frog consists of the brain, which is enclosed in the skull, and the spinal cord, which is enclosed in the backbone. Nerves branch out from the spinal cord. It is exceptionally difficult to find any parts of the central nervous system except for **nerve branches** coming out of the spinal cord in the back, near the kidneys.

Be careful to follow the directions in the lab procedure or you will damage the organs and perhaps ruin your ability to see the organs and see where they are placed in the body. Where they are placed affects how they work.

It is also important that you wear appropriate protection while dissecting the frog. Chemicals are used to make sure the organs stay in good condition so you can learn from them, but they are only meant to be in contact with dead things - not living things like you. Even though your skin could handle the chemicals, gloves are recommended. Your clothes will not be damaged by the chemicals but it never hurts to be safe.

Most importantly, the chemicals will hurt your eyes, so goggles are required at all times during the dissection. To make sure that you do not remove the chemicals from the lab, you will also be required to wash your hands after each



This is the biggest and best lab of the year!

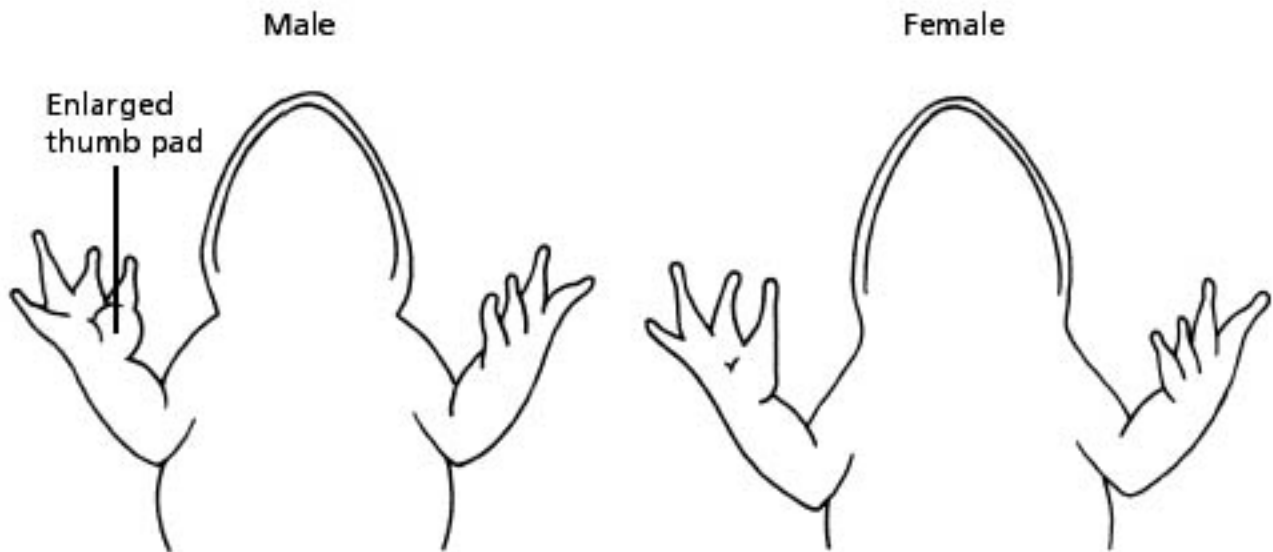
- be careful !**
- have fun !**
- and learn a lot !**





PROCEDURE:

1. Put on safety goggles, gown and gloves
2. Place a frog on a dissection tray. To determine the frog's sex, look at the hand digits, or fingers, on its forelegs. A male frog usually has thick pads on its "thumbs," which is the one external difference between the sexes, as shown in the diagram below. Male frogs are also usually smaller than female frogs. Observe several frogs to see the difference between males and females.

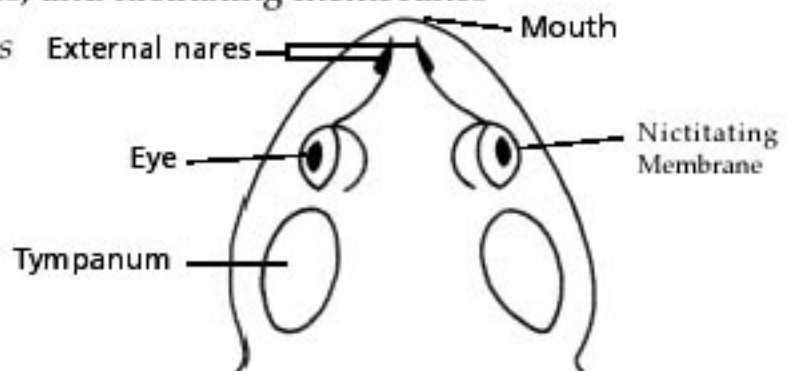


3. Find the following parts of the frogs anatomy and inspect for any interesting differences between you and the frog:

- forelimb: upper arm, forearm, and hand
- hindlimb: thigh, leg, and foot
- webbing
- cloaca hole

4. Use the diagram below to locate and identify the external features of the head:

- mouth, nostrils (or nares) , eyes, and nictitating membranes
- eardrums *also called tympanums*



5. Turn the frog on its back and pin down the legs and arms into the dissection tray.

-the best placement of the pins is at the elbows and knees

6. Cut the hinges of the mouth and open it wide.

Use the diagram below to locate and identify

the structures inside the mouth. Use a dull

probe to help find each part:

-the teeth

-the tongue

-the esophagus

-the pharynx

-the nostrils (or nares)

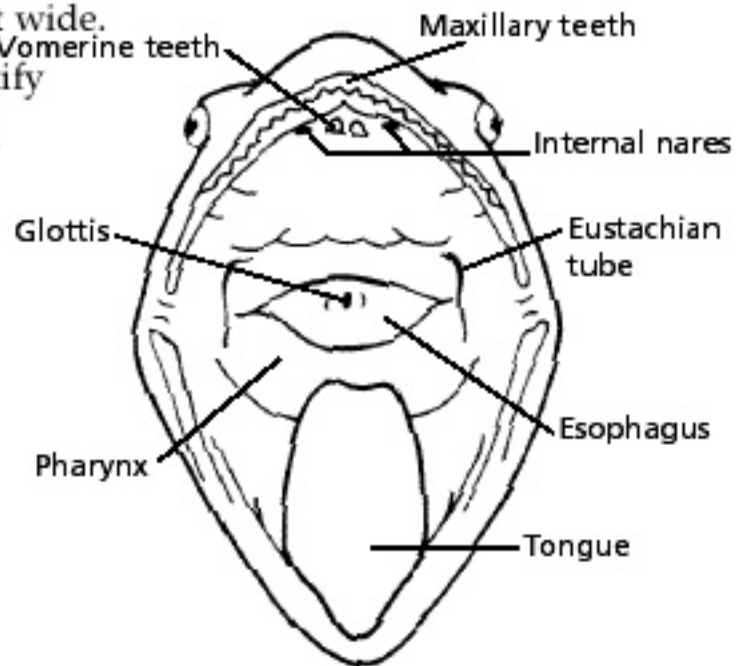
-the esophagus

-the glottis

-the Eustachian tubes

don't worry about trying to hard to find this one

- it is hard to find and is very, very small - this tube is the one that causes you to have pain when you have an ear infection



1. Put on safety goggles, gown and gloves

2. Look for the opening to the frog's cloaca, located between the hind legs. Use

forceps to lift the skin and use the scalpel to make an incision into the skin.

Put your scissors into the hole you made

and cut along the center of the body

from the cloaca to the lip. Turn back the skin,

cut toward the side at each leg, and pin the skin flat.

This diagram shows how to make these cuts.

Follow the lines drawn.



Incisions for Dissection

3. Lift and cut through the muscles and breast bone to open up the body cavity. If your frog is a female, the abdominal cavity may be filled with dark-colored eggs. If so, carefully remove the eggs with your blunt probe and put them on one side so you can see the organs beneath them.

4. Use the diagram on the next page, or even your apron, to locate and identify the organs of the-

digestive system: esophagus, stomach, small intestine, large intestine, cloaca, liver, gallbladder, spleen and pancreas.

-you can use your dull probe to go down the esophagus to the stomach

circulatory system: heart, which has a top part (left and right atrium) and a bottom part (the ventricle), a vein, and an artery

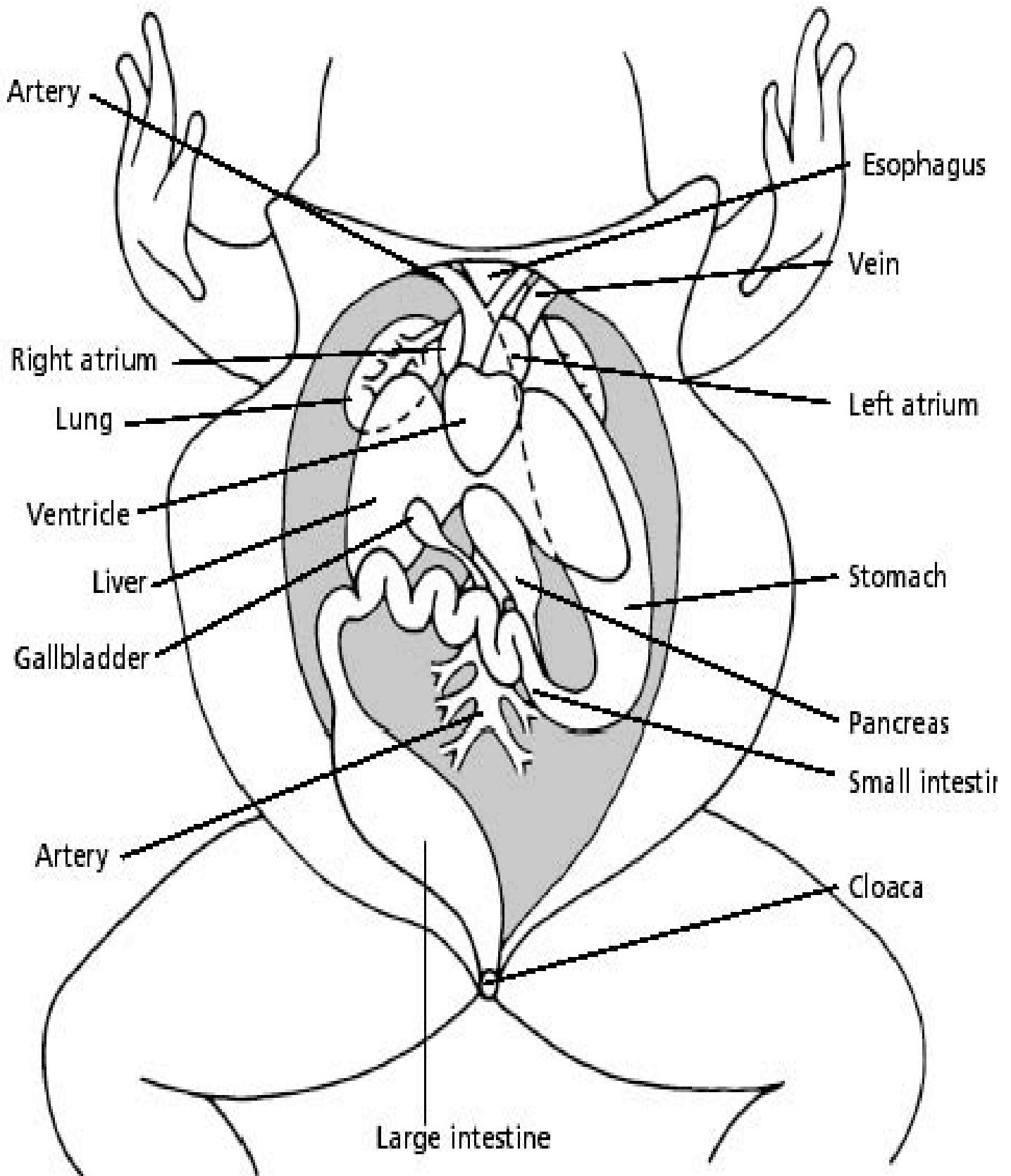
respiratory system: lungs connected to the glottis

-you can use your dull probe to go down the windpipe from the glottis

Once you have seen the organs of the entire system you can remove the organs, but put them aside on your tray until you have completed the dissection of that system. You can leave all the organs in place, but seeing some of the organs in the back will be difficult.



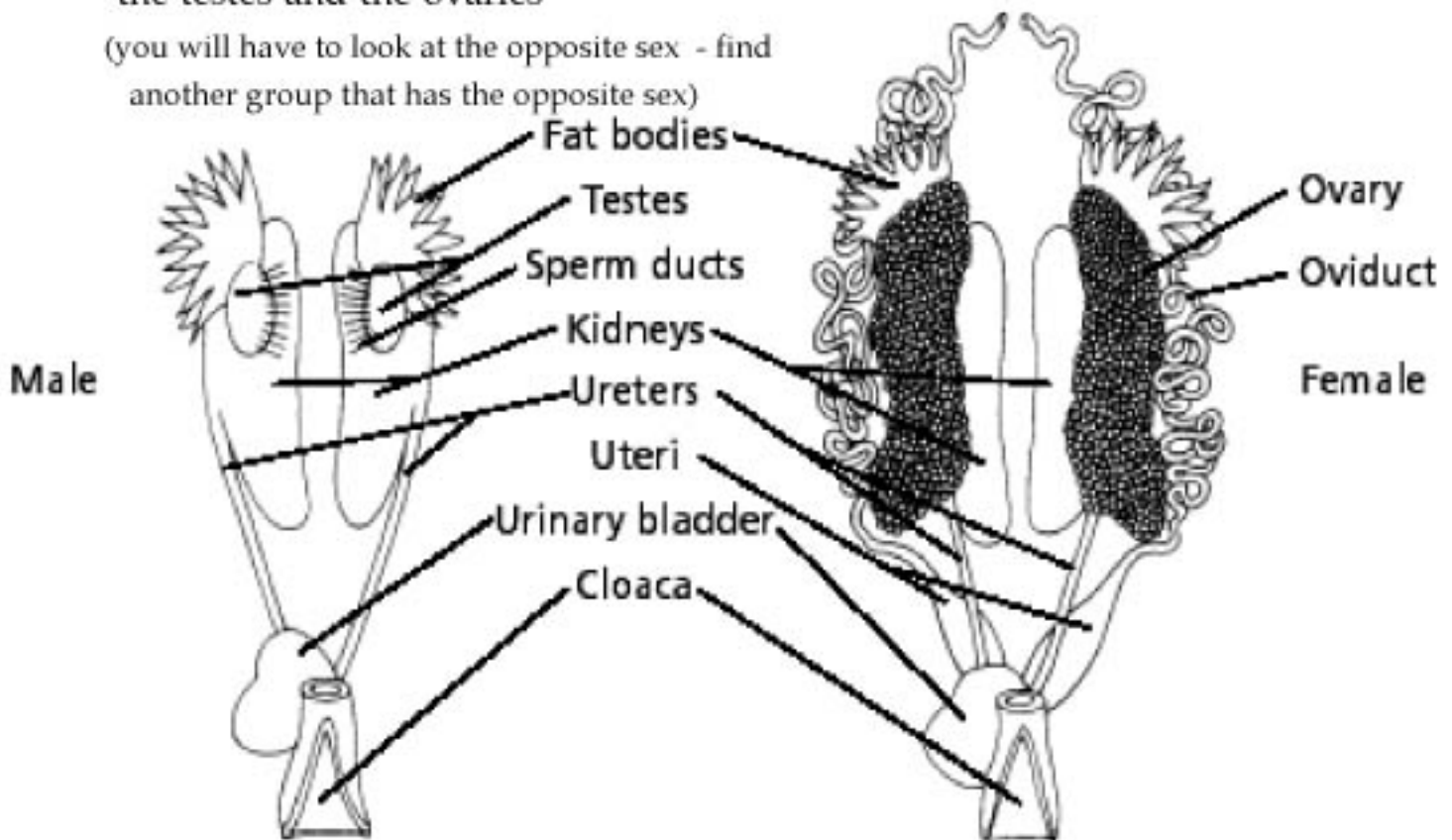
Abdominal and Chest Cavities of the Frog



1. Put on safety goggles, gown and gloves
2. Use a probe and scissors to lift and remove the intestines and liver from the body if you have not already done so.
3. Use the diagram below to identify the parts of the urinary and reproductive systems. Remove the connective tissue that lies on top of the red kidneys. Look at the yellow fat bodies that are attached to the kidneys. Find the:

- kidneys
- ureters
- the urinary bladder
- the testes and the ovaries

(you will have to look at the opposite sex - find another group that has the opposite sex)



4. Remove the kidneys with scalpel and probes and look for threadlike spinal nerves that extend from the spinal cord.
5. Prepare the frog according to the directions from your teacher. Clean up your work area and wash your hands before leaving the lab.

Questions:

1. List the organs of the Digestive System:

2. List the organs of the Circulatory and Respiratory Systems:

3. List the organs of the Urinary System:

4. What do you think is the function of the nictitating membrane, and why?

5. A frog does not chew its food. What is the function of its teeth?

6. The abdominal cavity of a frog at the start of hibernation would be full of large fat bodies, but at the end of hibernation season it would contain very small fat bodies or none at all. How do you think the fat bodies work?

7. Structures of an animal's body that help it in its environment are called adaptations. When you looked at the external anatomy of the frog, did you find any adaptations? If so, what was one of them and how does it help the frog?

8. What is one difference between the anatomy of a frog and the anatomy of a human being? How does the difference between our anatomies help us in our environment or life style?
