

Fetal Pig Dissection Lab

Introduction: In this lab you will be examining many characteristics of an unborn mammal--the fetal pig. Dissection will help you to get a 3-dimensional picture of how all the systems fit together in an entire organism. You've seen separate diagrams of many of the major systems. Now you'll get to see how they are all arranged spatially. You'll also get a better idea of the texture of many organs that make up the pig's system. For additional help at home:
<http://www.esu7.org/~lweb/Lakeview/science/fetal.html>.

This lab will be divided into the following lab components:

- | | |
|------------------------|------------------------|
| #1- External Anatomy | #5- Respiratory System |
| #2- Oral Cavity | #6- Urogenital System |
| #3- Digestive System | #7- Nervous System |
| #4- Circulatory System | |

Materials: preserved fetal pig, dissecting pan, scissors, forceps, blunt probe, twine/string, safety goggles, one pair of disposable latex gloves per dissection day, tape measure.

General Directions: All underlined words must be located on your pig and all numbered questions must be answered on each of your packets. Your teacher will check the questions as you work through the laboratories. Most cuts can be done with the scissors. Dissection is an art and you must carefully dissect without destroying your pig. Keep all parts with your pig!

Pig Lab #1 - External Anatomy - see figures on pkt p. 6 and 15

You will be examining several characteristics of an unborn mammal. Use packet page 13 to review the directional names for the pig. The period of gestation for the pig is 112-115 days.

The age of the fetus can be estimated by measuring the body length from the tip of the snout to the attachment of the tail on the pig's dorsal side. Compare this length to the data given on relative sizes of a fetal pig at different times during gestation or the time of development inside the uterus. (mm = millimeters)

21 days : 11 mm	56 days : 40 mm
35 days : 17 mm	100 days: 220 mm
49 days : 28 mm	115 days: 300 mm

Generally speaking, mammals are recognized and classified by their external appearance. The external features which separate mammals into orders include: the number of digits (toes or fingers) on the feet, method of walking or other locomotion, and characteristics of the teeth.

Mammals have two unique, external characteristics which distinguish them from all other vertebrates: (1) all mammals have hair at some time during their development, and (2) all female mammals possess mammary glands with external openings for nourishing offspring with milk. Your fetal pig probably does not have a lot of hair due to the fact that it is not fully developed yet. However, at maturity most pigs do have hair.

The lips around the mouth are well developed and the upper lip has a groove called the philtrum. Humans also have a philtrum. This is the indent underneath your nose and just above your upper lip.

The external nares (nostrils) are found on the nose.

Examine the ears. They have a flexible outer flap called the pinna. The pinna helps the pig hear by focusing the sound into the middle ear.

Many mammals have sensory facial hairs called vibrissae; however, our pigs do not possess these yet. They are evident once a pig reaches maturity. They help organisms feel their way around in the dark. Vibrissae of dogs and cats are commonly called whiskers.

Examine the eyes. They have an upper and lower lid and a small mass of tissue in the upper corner known as the nictitating membrane. This membrane helps keep the eye clean. Birds can moisten their eyes in flight using this membrane and not blinking; blinking could cause a collision with a branch or tree.

Examine the feet. The pig is called unguligrade because it walks on its hooves. Humans are plantigrade because we walk on the entire soles of the foot. Dogs and cats are digitigrade because they walk on their digits. In pigs, the first digit of both the fore and hind limb is absent and the second and fifth are reduced in size but remain functional.

The pig's trunk is divided into two regions: thorax (chest) and abdomen (stomach). Examine the umbilical cord. Observe that it contains three blood vessels: a large vein (blue) and two smaller arteries (red).

Observe the paired row of nipples on the ventral surface of the abdomen in **both** sexes. The actual number of nipples varies from mammal to mammal. Animals that have litters tend to have more nipples.

Pig Gender Determination Information

The penis and urethral opening of the male pig are located posterior to the umbilical cord on the pig's ventral surface. If your pig is young, the scrotal sacs (ventral to the tail and anus) may still be empty, as the testes descend just before birth. If you have a more mature male, the testes will have descended to fill the scrotum. If the pig is female, you will notice a small projection just below her tail. The opening immediately ventral to her tail is the anus; the opening ventral to the anus, associated with the small projection, is the vaginal opening.

Most mammals have separate urogenital and anal openings. In female pigs the urinary and genital openings are also separated. The urethral opening is the most ventral with the vaginal orifice just dorsal to the urethral opening. The anus is located at the base of the tail dorsal to the vaginal orifice. Be sure to be able to identify both male and female pigs and their reproductive structures.

Locate all three openings (urethral opening, vaginal orifice, and anus) on the female pig. The urethral opening excretes urine and the vaginal orifice is the opening of the birth canal. In males, the urogenital structures consist of the penis (which has an opening just behind the umbilical cord) and two sac-like swellings called the scrotum, containing the testes. The scrotum lies ventral to the anus. The anus of the male is at the base of its tail. Locate these two openings: urogenital opening of the penis and the anus. They are posterior to the umbilical cord.

Internal Anatomy - General Directions:

In the dissection and observations of the internal organs, you will proceed by systems and *remove organs only when directed to do so*. Study and use the accompanying diagrams to aid in your observations of the internal organs. As you dissect, keep in mind the interrelationships of systems. While concentrating on a single system, use care not to damage other systems. Again, ALL cuts will be done with the scissors.

Dissection is an art. You must carefully and accurately dissect your pig so you can identify all important parts. Use caution when carrying and cleaning sharp dissection tools.

Pig Lab #2 - Oral Cavity - see figures 2, 3, 4 (pkt p. 7) and pkt p. 15

You will now study the oral cavity (mouth) of the pig. With a pair of scissors cut deeply into both corners of the mouth (see figure 2, pkt p. 7). *This may be difficult as you must cut through both tissue and bone*. Open the mouth. Be sure to follow the curvature of the throat and do not cut straight back into the neck tissue.

Examine the oral cavity containing the tongue and teeth. Notice the ridged roof of the mouth called the hard palate. The soft palate is the fleshy portion of the roof of the mouth and lies caudal to the hard palate. Locate the tongue with all its taste buds. Mammals have two types of teeth - incisors, located in the very front of the oral cavity and cheek teeth located toward the back of the oral cavity.

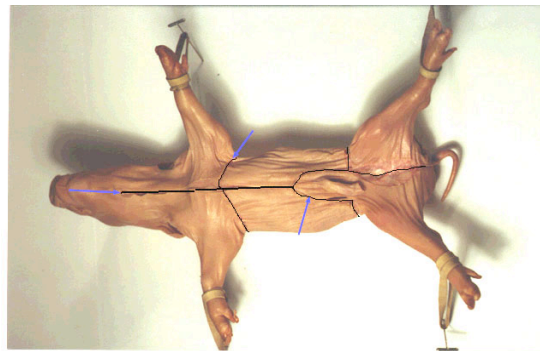
To find the next few structures, you will have to cut through the bone of the jaw, and then apply gentle pressure to force the mouth open.

Far back in the oral cavity (See figure 4, pkt p. 7) is the pharynx, a common passage for food going to the esophagus and air going to the lungs. Locate the tear-shaped epiglottis, a flap like structure at the top of the trachea. The esophageal opening, which is the entrance to the esophagus (food tube) can also be found in the nasopharynx. The esophagus is located dorsal to the trachea.

Pig Lab #3 - Digestive System - see figure 5 (pkt p. 8) and pkt p. 15

Use two pieces of strong twine and tie one around a wrist and one around an ankle of the pig. Pull each under the dissecting pan and tightly tie the twine to the opposite wrist or ankle. To open the abdominal cavity, make incisions as indicated in figure #1a (see also figure 1b on pkt p. 6). **Cut carefully with scissors** to avoid damaging the underlying organs. Hold scissors parallel to the pig, don't stab pig with scissors. Lift the scissors upward with every cut to make sure you don't damage internal organs. It's okay to make your first cut shallow, then progressively get deeper with repeated attempts. Note--when you cut through the thoracic cavity, you will encounter bone. You must cut through this bone to expose the underlying organs. Cut the skin flaps back to the dorsal surface so the flaps will remain open and expose internal organs. Be careful not to injure the kidneys. Pull back the two flaps of skin (you will need to cut the diaphragm along the sides) and muscle to view the internal organs. Locate the umbilical vein inside the abdomen. Once identified, cut it and lay back the cord and its strip of skin.

Figure #1a



The large, reddish-brown organ that occupies much of the abdominal space is the liver. Gently lift it up and probe it to locate the gall bladder which is on the pig's right side.

The diaphragm (a thin brown muscular tissue) is the tough muscle which separates the thoracic and abdominal cavities. The esophagus goes through it to the stomach. The esophagus carries the food from the pharynx to the stomach.

Locate the stomach on the upper left side of the abdominal cavity. It is underneath the liver. The stomach resembles a pouch in appearance and is connected to the esophagus at its anterior end. Slit open the stomach longitudinally. The longitudinal ridges that line the stomach are called rugae. The constricted caudal portion of the stomach leads to the small intestine. The first 3-4 cms of the small intestine is the duodenum. The remaining length is divided into the ileum and jejunum. Observe that the small intestine is not loose in the abdominal cavity but is held in place the the mesentery. Check and look for veins and arteries in the clear mesentery that carry absorbed nutrients to the liver through the hepatic-portal vein.

Inside the small intestine are finger-like projections called villi. The villi increase the surface area of the small intestine for absorption. These villi are microscopic.

The large intestine appears as a compact coil and is larger in diameter than the small intestine. Locate the junction of the large and small intestine. Below this junction may be found a small pouch-like structure called the caecum. This is the same item that is the appendix in humans. It helps in the slow digestion of plant materials in other animals.

Follow the large intestine (colon) to the rectum. This lies in the dorsal wall of the abdominal cavity and is the straight end portion of the large intestine. Water is absorbed by the body in the large intestine. Waste material stored in the rectum leaves the body through the anus.

Locate the pancreas which is a large white granular organ located below the stomach. The pancreas makes a variety of digestive enzymes that travel to the small intestine through the pancreatic duct. This duct is difficult to find in the pig. The red elongated organ extending around the outer curvature of the stomach is the spleen. It resembles a tongue. The spleen helps destroy old red blood cells.

Pig Lab #4 - Circulatory System - see figure 6 (pkt p. 7) and pkt p. 16

The circulatory system of the pig consists of the heart, arteries, veins, and capillaries. There are two major parts to this system. Pulmonary circulation moves oxygen-poor blood to the lungs and returns oxygen-rich blood to the heart. The systemic circulatory system supplies all parts of the body with oxygen-rich blood via arteries & arterioles and returns oxygen-poor blood to the heart via venuoles & veins.

You will need to cut through the sternum to open the thoracic cavity. Covering the heart is a thin, tough membrane called the pericardium. Partially covering the heart is the thymus gland (globular structure). The thymus is largest in young individuals. The thymus is part of the immune system and makes T-cells.

The heart is composed of 4 chambers. Locate the 2 atria and 2 ventricles. How can you visually distinguish between the atria and ventricles?

The pig may have been injected with colored latex which makes it easy to locate the veins (blue) and the arteries (red). Locate the anterior and posterior vena cava. These carry blood from the cranial and caudal portions of the body, respectively.

Find the pulmonary veins which carry blood from the lungs to the left atrium. This carries oxygenated blood from the lungs back to the heart. The most noticeable artery is the aorta. The aorta curves to the left and passes cranially along the dorsal side of the thoracic and abdominal wall. The next largest artery is the pulmonary artery. It arises from the anterior portion of the right ventricle and soon divides into the right and left pulmonary arteries.

Other arteries are named for the body part they serve. The gastric artery leads to the stomach, the hepatic artery leads to the liver, the renal artery leads to the kidney and the carotid artery leads to the head. Locate the carotid artery, jugular vein and the descending aorta.

Remove the heart by carefully cutting the arteries and veins leading to and from the heart as far away from the heart as possible. **DO NOT** damage any lung tissue. Cut the heart in half through the frontal plane using a sharp blade. **ASK FOR TEACHER ASSISTANCE** if at any time you are unsure of the procedure. Identify the right atrium, right ventricle, left atrium, and left ventricle. The valves that prevent the back flow of blood are the A/V valves and the semilunar valves. A/V valves are found between the atria and the ventricles. The semilunar valves are found between the ventricles and the pulmonary artery and vein. The structure between the two ventricles is the septum.

On the surface of the heart are the coronary arteries and veins.

A characteristic feature of the fetal mammalian heart is the ductus arteriosus. This short vessel allows blood to bypass pulmonary circulation until birth, at which time there is a complete closure of the vessel.

Pig Lab #5 - Respiratory System - see packet page 16

The respiratory system is responsible for the exchange of gasses. The pig must take in oxygen to burn food and must rid itself of carbon dioxide waste once it's born.

Air enters through the external nares. Air is drawn into the nasopharynx or nose chambers where sensory nerve cells detect smell. Here, also, is where the glottis (the opening of the trachea) may be found. The trachea is a tube that extends from the neck to the chest. It is white and lined with cartilage. The enlargement at the anterior end of the trachea is the larynx (voice box) which contains the vocal cords.

The trachea splits in the chest cavity into two bronchi. Each of these air tubes extends into the lungs and splits into smaller tubes called bronchioles.

The lungs are located on either side of the heart. The lungs are made of tiny air sacs called alveoli (microscopic) where gas exchange occurs.

Locate the thin muscular diaphragm just above the liver. This muscle is responsible for drawing air into the chest cavity. Spasms of this muscle result in hiccups!

Fig Lab #6 - Urogenital System - see packet page 16

This lab is a study of the urogenital system. The "uro" in urogenital stands for the urinary system. The "genital" portion stands for the reproductive system. Diagram E may help you with this system. The urinary or excretory system and genital system are structurally related. Therefore, it is convenient to study them together. Recall that you are dealing with paired structures. What is observed on one side may also be seen on the other. To find the kidneys, look for two lumps low in the abdominal cavity. They are behind a membrane called the peritoneum. You will need to carefully remove the peritoneum to see the bean-shaped kidneys.

Locate the ureter originating from the concave side of the kidney. Follow the ureter posteriorly until it joins the urinary bladder. Do not remove any of these organs. The renal artery and vein also come out of the kidney. The artery carries blood to the kidney. The vein carries blood out of the kidney. Remove one kidney and dissect it horizontally into 2 halves. See your text if you need help. Locate the cortex and the medulla on one half of the kidney.

Prepare for the observation of the reproductive organs of the male or female by pulling the hind legs apart. With scissors, cut anteriorly a little to one side of the mid-ventral line to avoid cutting the penis on the male. Press firmly on the tissue between the legs to feel the cartilaginous structure of the pubic symphysis. This is part of the pelvic girdle. Continue the incision anteriorly and cut through the pubic symphysis. Expose the urethra. This tube leads from the bladder to the outside world.

Male Reproductive System:

Examine the scrotal sac (scrotum) at the posterior end of the male pig. Open one sac and determine the presence of a testis. The testes descend just before birth to the outside of the body proper. This procedure is very important, as the ordinary temperature of the human body (98.6°) would kill sperm. The 3-4 degree lower temperature of the testes outside the body keeps the sperm viable or alive. If your specimen is advanced in fetal development, the testes may have already descended into the scrotal sacs. Otherwise, they may be found in a tube like structure, the inguinal canal, small oval organs. In either case, locate one of the testes and note the coiled tubule making up the epididymis. Follow this tube forward as it passes through the inguinal canal as the vas deferens. Follow the vas deferens. At this point, as in humans, the urethra becomes a urogenital duct.

Female Reproductive System :

Spread the legs to separate the pubic symphysis and thereby expose the female reproductive system. Locate the oval-shaped ovaries which are found caudal to the kidneys. Leading from the ovaries are the twisted oviducts or Fallopian tubes. The oviducts continue posteriorly and are soon supported by broad ligaments. Further on, the oviducts join to form the common uterus. You will notice a slight constriction of the common uterus marking the location of the cervix. The cervix can often be a site where cancer develops in females. Posterior to the cervix, the remainder of the tube forms the vagina. Locate the point where the urethra joins to form the common-urogenital sinus.

***MAKE SURE YOU OBSERVE A PIG WHICH IS THE OPPOSITE SEX OF YOURS. YOU WILL BE RESPONSIBLE FOR IDENTIFYING BOTH THE MALE AND FEMALE REPRODUCTIVE PARTS!**

Fig Lab #7 - Nervous System:

May only be done AFTER your group has thoroughly performed labs 1-6 and group has obtained teacher's permission.

EVEN IF YOU DO NOT HAVE TIME / PERMISSION TO PERFORM THIS DISSECTION, YOU MUST ANSWER THE QUESTIONS FOR LAB 7!

The Brain - use your text for help.

This dissection is difficult, tedious work and requires proceeding carefully to avoid destroying important brain tissues. Position the animal so that the dorsal side is up. Remove the skin from the entire skull.

The central nervous system consists of the brain and spinal cord. In order to observe the brain, the skull bone, or cranium needs to be removed. Insert the point of your scissors just under the bone at the base of the skull. Angle the tip of the scissors upward so as not to damage the soft brain tissue. Cut forward along the midline of the brain to the eyes. Cut to either side at the point where you began cutting and the point where you stopped cutting. Gently remove the cranium by carefully using forceps to break and peel away the pieces.

The meninges are the membranes which cover the brain. Mammals have three layers of membranes. The dura mater is the outermost, the pia mater is the inner membrane, and the arachnoid mater lies in between.

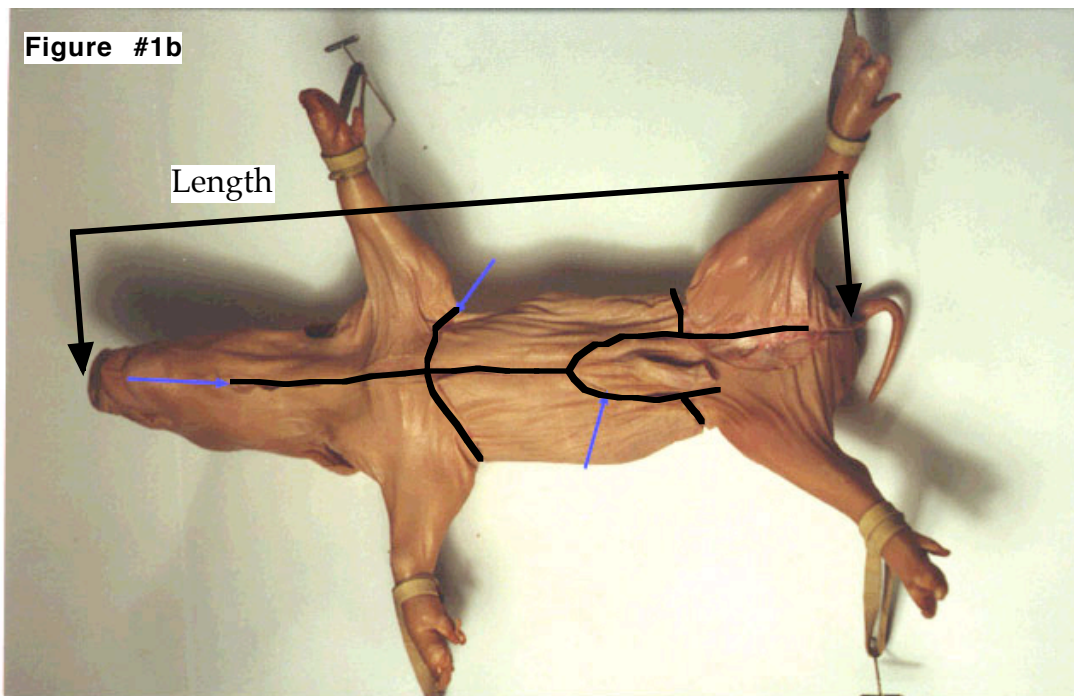
The small olfactory lobes are located at the anterior end of the brain. These lobes receive nervous stimuli from the nose and are concerned with the sense of smell.

Behind the olfactory lobes is the cerebrum. The cerebrum is divided into two cerebral hemispheres by a deep groove named the longitudinal cerebral fissure. The cerebrum of most mammals has a folded surface. The cerebrum controls voluntary muscle movements, thinking, memory, judgment, and the senses.

Behind the cerebrum is the cerebellum. The cerebellum is principally a motor coordinating center.

Behind the cerebellum is the medulla oblongata which leads to the spinal cord. The medulla oblongata controls respiration, heart rate, and blood pressure. It also helps in regulating sensory impulses, hormonal secretions, and general awareness (consciousness).

Lab #1 and #3: External Anatomy and Digestive System Cuts



Lab #2: Oral Cavity

Figure #2

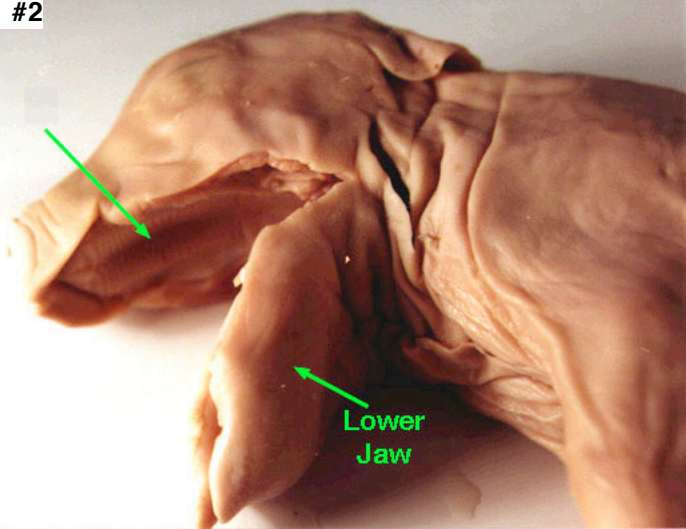


Figure #3

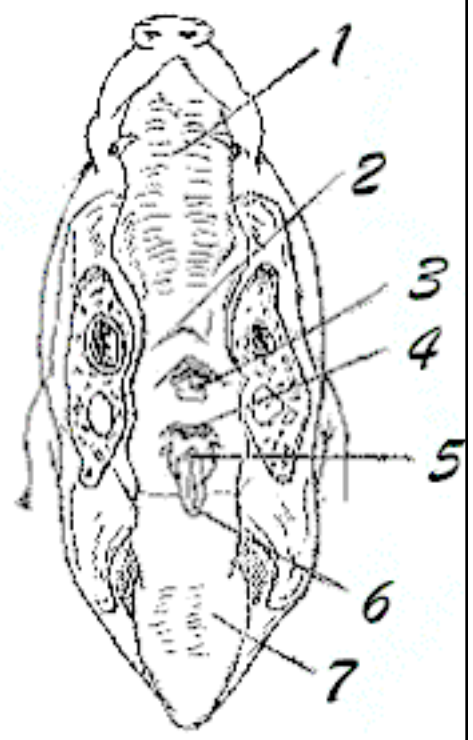
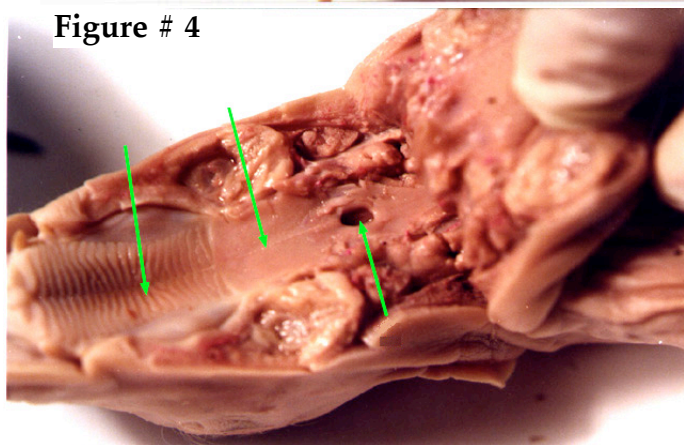
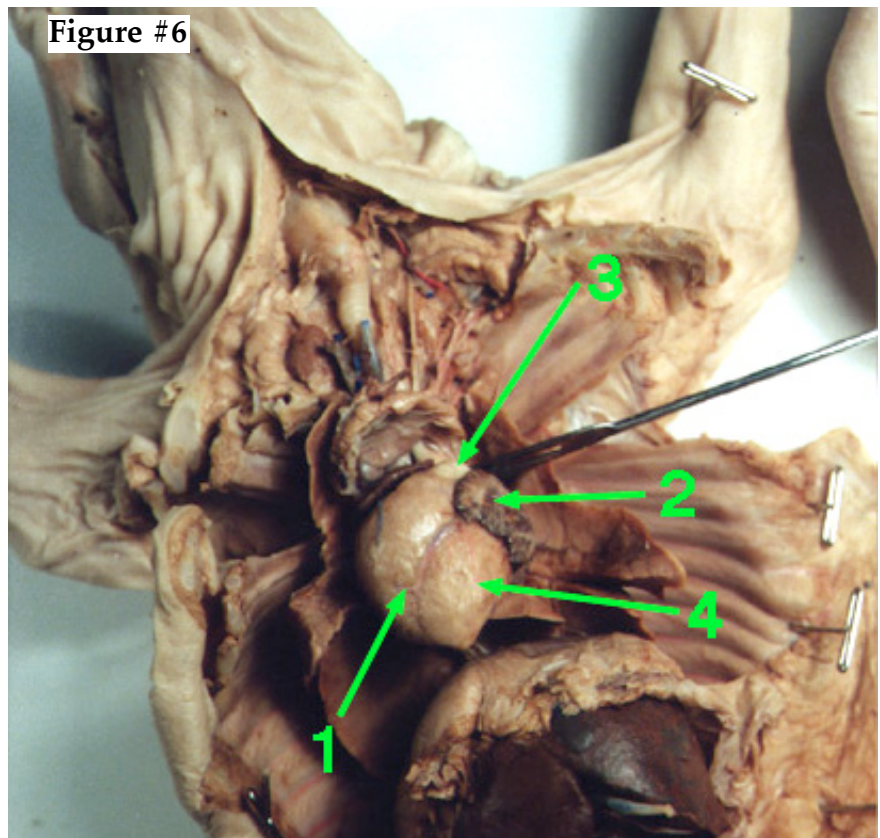


Figure #4



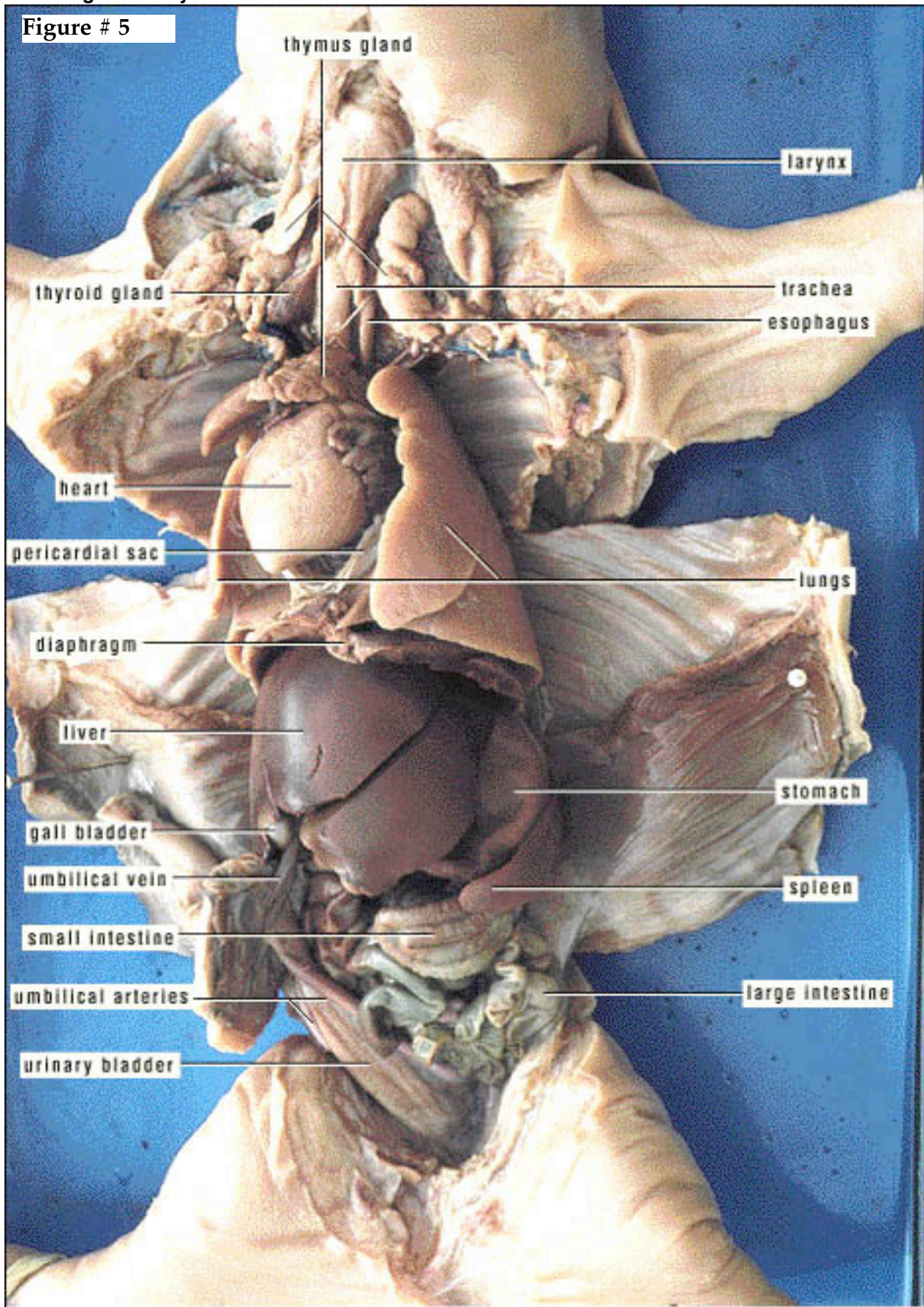
Lab #4: Circulatory System

Figure #6



Lab #3: Digestive System

Figure # 5



Fetal Pig Dissection Lab Analysis Questions

Answer all these questions thoroughly and completely after having completed the dissection in class. You are responsible for knowing this information for quizzes and the pig tests. You may want to indicate answers on separate paper (like in your notebook).

Pig Lab #1 - External Anatomy

1. What is meant by gestation period?
2. What is the approximate age of your pig?
3. How many digits are present?
4. What differences can be observed in the structure of an artery and a vein?
5. How does a fetus get rid of its waste products?
6. What type of external features are used to separate mammals into orders?
7. Name the two external characteristics which distinguish mammals from other animals.
8. What goes in and out of the external nares?
9. What is another word for pinna? What is its function?
10. What is the function of the pig's vibrissae? Explain completely.
11. What is the function of the pig's nictitating membrane?
12. What is another name for the chest region of the pig?
13. What is another name for the "belly " region of the pig?
14. What is meant by urogenital openings?
15. Describe the major differences between a male and female pig's urogenital opening(s).
16. What does the urethral opening excrete in males? Females?
17. What is the vaginal orifice?
18. What does the scrotum contain?
19. Explain the difference between digitigrade, plantigrade, and unguligrade locomotion.
Which type is seen in pigs? Dogs? Deer? Humans?

Pig Lab #2 - Oral Cavity

1. Why are the senses of taste and smell important to organisms?
2. Why do you think the incisors of rodents (such as mice and rats) are so large and never stop growing? Why do pigs and humans not need these large incisors?
3. How does the tongue aid in eating?
4. How are the hard and soft palate indirectly used in digestion?
5. The hard palate separates the oral cavity from which other cavity?

6. What is the function of the epiglottis?
7. What substances are secreted by the oral cavity of humans that aid in digestion? Name these substances and tell what each does to help digestion.
8. The esophageal opening is the top of which tube? Where does this tube lead?

Fig Lab #3 - Digestive System

1. To what organ does the umbilical vein lead?
2. Describe the intestinal mesentery.
3. Where is the intestinal mesentery attached?
4. In humans, what structure is found at the junction of the small and large intestine?
5. What is the posterior opening of the digestive tract called? The anterior opening?
6. How many lobes (sections) does the liver have?
7. Where does the bile duct lead to and what substance does it carry?
8. List the function of each organ below:
 - a. stomach
 - b. esophagus
 - c. small intestine
 - d. large intestine
 - e. pancreas
 - f. liver
 - g. gall bladder
9. What structure separates the thoracic cavity from the abdominal cavity? Spasms of this muscle cause what problem?
10. List two organs found in the thoracic cavity.
11. Describe the appearance of the inside of the stomach. How do the rugae within the stomach aid in mechanical digestion?
12. How can you tell where the small intestine stops and the large intestine begins?
13. How do enzymes produced in the pancreas come in contact with food since food does not pass through the pancreas?
14. What is an ulcer?
15. What is done in an appendectomy? Through which cavity does the surgeon enter?

Fig Lab #4 - Circulatory System

1. What's the function of the thymus?
2. Which is larger, the right or left ventricle? Why?
3. Describe the difference between the right and left atria.
4. From what chamber does the pulmonary artery exit?

5. From what chamber does the aorta originate?
6. To what structure do the pulmonary arteries lead?
7. What is the importance of the coronary circulation?
8. What problem results if coronary circulation is interrupted?
9. Why are arteries larger than veins?
10. What are the primary functions of the circulatory system?
11. Name the process that moves molecules from an area of high concentration to an area of low concentration. In which type of blood vessel does this process occur? Why?
12. What is the function of heart valves?
13. In humans, what results when a valve is leaking blood backwards in the heart?
14. Why is it so difficult to get to the heart during open heart surgery?
15. Identify the body part(s) supplied by the artery or vein listed below:
 - a. hepatic artery
 - b. carotid artery
 - c. thoracic aorta
 - d. aorta
 - e. cranial vena cava
 - f. caudal vena cava
16. Explain in paragraph form the complete trip of a drop of blood through the heart and body. Start the trip in the right atrium. Be sure to use the words below:

right atrium	aorta	a. v. valve
left atrium	pulmonary arteries	lungs
right ventricle	pulmonary veins	semilunar valve
left ventricle	cranial (anterior) vena cava	caudal (posterior) vena cava

Fig Lab #5 - Respiratory System

1. Describe the exchange of gases in the lungs.
2. Explain (in paragraph form) the pathway of air from outside the body to the bloodstream. Be sure to use the following words: nose, mouth, nasal cavity, lung, bronchi, trachea, alveoli, bronchioles.
3. Why is the trachea constructed with rings of cartilage?
4. What's the primary function of the respiratory system?
5. Why do you think the bronchi branch extensively into tiny air tubes?
6. Carbon dioxide is exhaled from the lungs. How is it produced?

Fig Lab #6 - Urogenital System

1. What is the function of the kidneys? How many does the pig have? Where are they located?
2. What substances are carried in the urethra?
3. In which of the female's reproductive structures would embryonic or fetal pigs be found?

4. List a function for each of the following and write whether each is a male or female structure.
 - a. ovary
 - b. testis
 - c. uterine horn
 - d. vagina
 - e. epididymis
 - f. urethra
5. Why is the scrotum important?
6. Which blood vessel - renal artery or renal vein - would have the cleanest blood? Why?
7. Kidneys are important organs. What helps to protect kidneys within the pig's body?
8. List a function for:
 - a. ureter
 - b. urinary bladder
 - c. urethra

Pig Lab #7 - Nervous System

1. What is the function of the cranium?
2. Which lobes of the brain receive input from the nose?
3. What portion of the brain controls voluntary muscle movements?
4. What divides the cerebrum into a right and left hemisphere?
5. What is the role of the cerebellum in the body?
6. What part of the brain is the most posterior?
7. List a function for each of the following:
 - a. cerebrum
 - b. cerebellum
 - c. olfactory lobe
 - d. medulla oblongata
8. When a person suffers from a stroke, what happens?

Congratulations! At this point you have completed the laboratory. Review for the Lab Practical which asks you to know terminology, structures, and functions. Keep all of the parts of your pig together and have your teacher check the quality of your group's dissection.

Pig Dissection Directional Vocabulary

DORSAL

VENTRAL

CAUDAL

ANTERIOR

POSTERIOR

CRANIAL

HEPATIC

PULMONARY

CARDIAC

RENAL

GASTRIC

UROGENITAL

THORACIC

ABDOMINAL

Fetal Pig Dissection Anatomy Checklist

Be able to identify these parts on your pig specimen as well as state their functions!

LAB 1: External Anatomy

pinna	philtrum	vibrissae
nares	mammary glands	nipples
trunk	thorax	abdomen
anus	umbilical cord	tongue w/ taste buds
penis	scrotum	urethral opening
vaginal opening	age of pig	gender of pig
posterior	anterior	ventral
dorsal	umbilical artery	umbilical vein

LAB 2: Oral Cavity

tongue	incisors	cheek teeth
hard palate	soft palate	epiglottis
glottis	esophageal opening	nasopharynx

LAB 3: Digestive System

esophagus in throat	esophagus in thorax	stomach
rugae	small intestine	caecum
large intestine	rectum	pancreas
spleen	liver	gall bladder
intestinal mesentery	umbilical vein	

LAB 4: Circulatory System

thymus gland	aorta	septum
pericardium	right & left atrium	right & left ventricle
atrioventricular valve	renal artery	jugular vein
carotid artery	umbilical artery	umbilical vein
pulmonary artery	pulmonary vein	

LAB 5: Respiratory System

trachea	larynx	bronchi
diaphragm	lungs	alveoli

LAB 6: Urogenital System

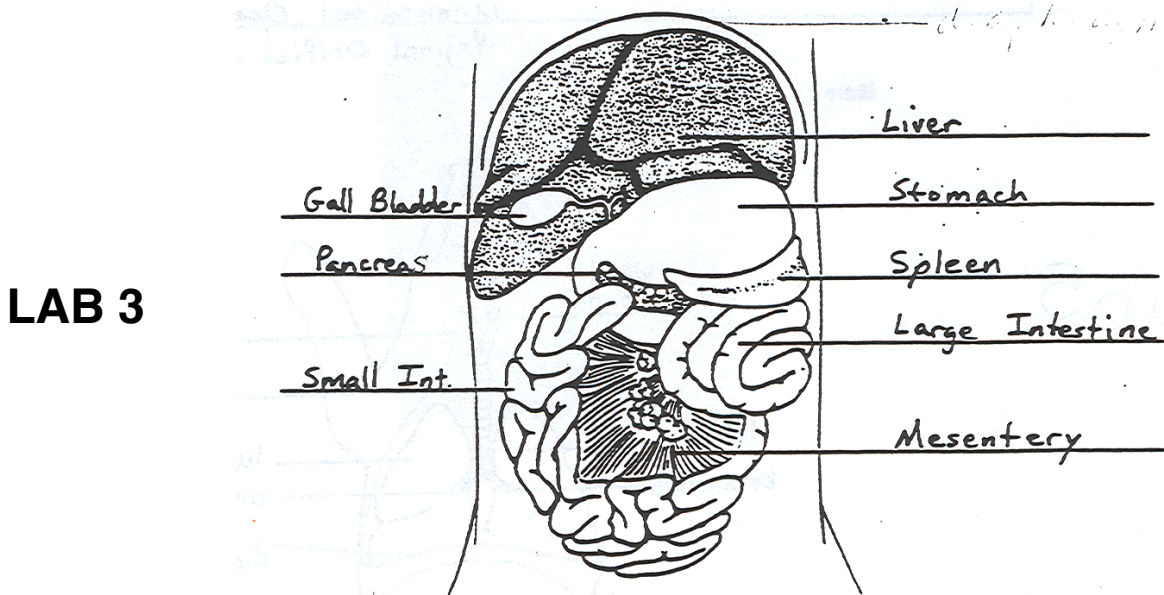
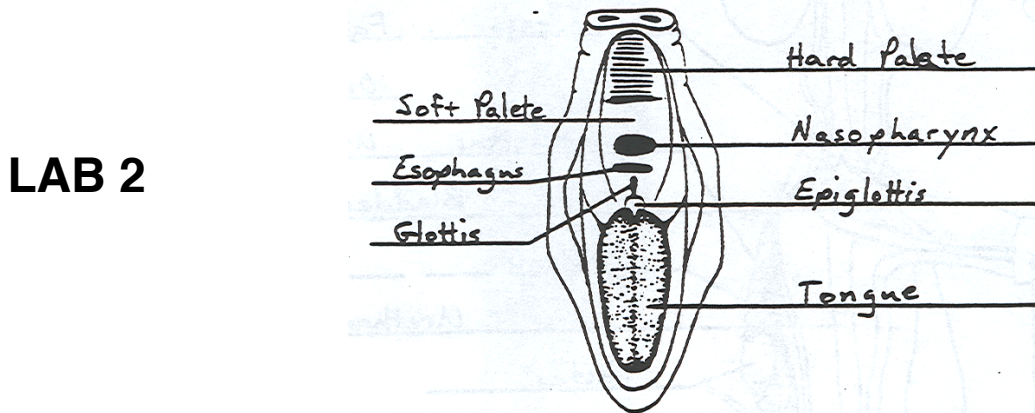
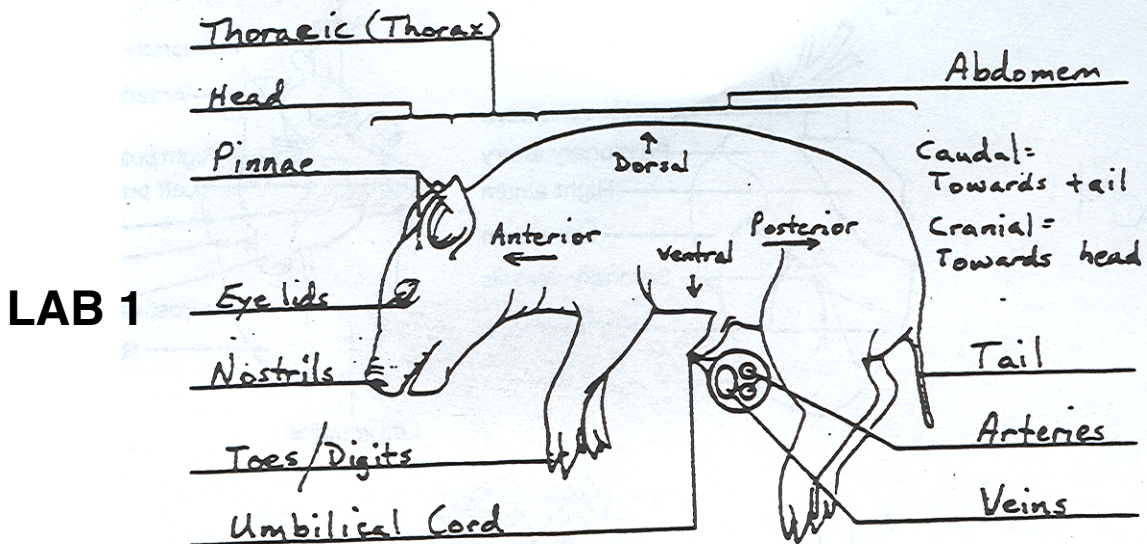
kidney	ureter	urinary bladder
urethra	medulla of kidney	cortex of kidney

MALE: testes scrotum epididymus

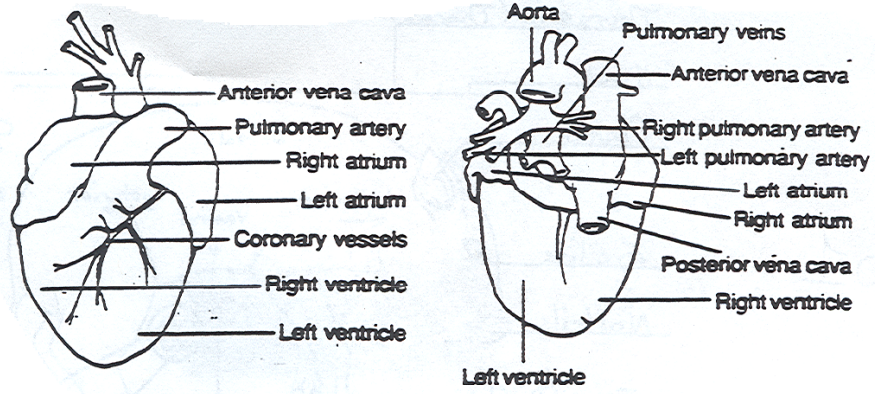
FEMALE: ovary oviduct vagina
 cervix uterus

LAB 7: Nervous System

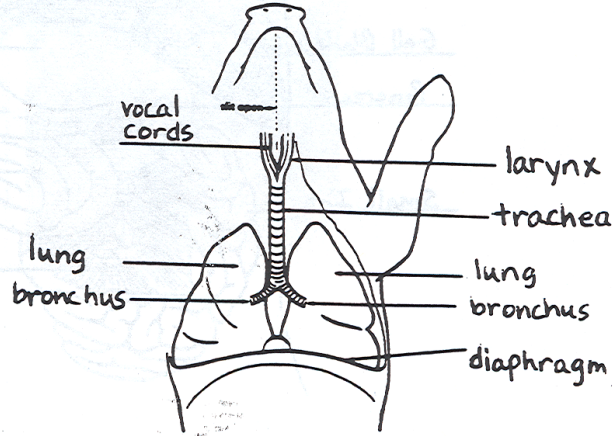
cerebellum	cerebrum	spinal cord	medulla
------------	----------	-------------	---------



LAB 4



LAB 5



LAB 6

