

OAKLAND CUSD #5

ANATOMY
MAY 4 - 8, 2020

DEBRA WELCH

Week #5: May 4-May 8, 2020

High School Science

Debra Welch

Hello students! I hope all of you are staying healthy. I just want everyone to know that I am thinking you and miss having school as normal. Remember to keep your immune systems strong! Basic directions are: You need to complete one lesson a week for only the class you were currently enrolled in and choose from the 3 choices. Choices 1 & 2 are for review of material we have already covered this year. I will start at the beginning and go through the year's material. Choice #3 will always be new work using your textbook or other handouts I include. I will make every effort to keep your work simple to do, considering that we are not learning together in the classroom. Your work should be turned in as a hard (paper) copy to the office or through email in a word or google document. My email is: debra.welch@oakland5.org. Please be sure all work has your name! If you have not turned in the assignment by the following Monday, I will need to email your parents and/or place a phone call home. Please be diligent to turn work in on time. I suggest you set up a schedule just as if you were at school and allow for the normal time period. Most assignments I send you will take less time than our normal 40 minutes. Comments will be made on paper copies and returned to you. If you send in homework answers as an email I will reply to your email and give my comments/reflections of your work. I will be supplying you with the necessary notes or you will need to use your book to find the answers. If you have any questions feel free to email me and I will get back to you by email during my office hours. If you can't email feel free to call the office and leave me a message. Good Luck and stay healthy!

Anatomy: for those of you who wanted to continue learning throughout the body systems I will be including notes and sending you powerpoints to use with Choice #3. If you plan to go into a medical field I advise you to go ahead and complete the Enrichment on the body systems we could not study due to school closure.

Lesson Choices on next page:

Class	Choice 1	Choice 2	Choice 3 (Enrichment)
Biology	<p>Principles of Ecology (Chap2):</p> <p>Fill out Reviewing Vocabulary p2 (refer to notes included or Chap 2 in text)</p>	<p>Communities Notesheet:</p> <p>Using your notes or Text Chapter 3 fill out the notesheet</p> <p>Do All pages</p>	<p>Refer to Ch21 on Plants:</p> <p>Do: Concept Map p12 AND Section 2-Nonvascular Plants/ Section 3-Seedless Vascular Plants</p> <p>Do ALL 3 pages</p>
Anatomy	<p>Questions: Ch 5 in text, p114- do the following: Questions: 1-3; 6-9; 10-15; 18-21.</p>	<p>Marieb text questions: (handout)</p> <p>p141: 1-26</p>	<p>Chap 13 Cardiovascular System:</p> <p><u>Act #1-</u> The Heart p1-11; color and answer questions. Week 5: p1-5 Week 6: p6-11</p> <p><i>I am including packets like this for those who want to continue their education in the rest of the body systems we could not cover due to COV-19.</i></p>

REVIEW QUESTIONS

LEVEL 1 REVIEWING FACTS AND TERMS

Match each numbered item with the most closely related lettered item. Use letters for answers in the spaces provided.

- | | |
|------------------------------------|--------------------------------------|
| ___ 1. histology | a. hyaluronan |
| ___ 2. microvilli | b. lines heart and blood vessels |
| ___ 3. gap junction | c. repair and renewal |
| ___ 4. tight junction | d. ligament |
| ___ 5. ground substance | e. endocrine secretion |
| ___ 6. basal and reticular laminae | f. merocrine secretion |
| ___ 7. germinative cells | g. absorption and secretion |
| ___ 8. mesothelium | h. fat cells |
| ___ 9. endothelium | i. holocrine secretion |
| ___ 10. mucus | j. study of tissues |
| ___ 11. destroys gland cells | k. unicellular exocrine glands |
| ___ 12. hormones | l. tendon |
| ___ 13. goblet cells | m. intercellular connection |
| ___ 14. adipocytes | n. histamine and heparin |
| ___ 15. macrophages | o. interlocking of membrane proteins |
| ___ 16. mast cells | p. lines ventral body cavities |
| ___ 17. bone-to-bone attachment | q. intercalated discs |
| ___ 18. muscle-to-bone attachment | r. striated, voluntary |
| ___ 19. skeletal muscle | s. defense and repair |
| ___ 20. cardiac muscle | t. basement membrane |
21. The four basic tissue types in the body are
 - (a) epithelial, connective, muscle, and neural
 - (b) simple, cuboidal, squamous, and stratified
 - (c) fibroblasts, adipocytes, melanocytes, and mesenchyme
 - (d) lymphocytes, macrophages, microphages, and adipocytes
 22. Long microvilli incapable of movement are
 - (a) cilia
 - (b) flagella
 - (c) stereocilia
 - (d) a, b, and c are correct
 23. A type of junction common in cardiac and smooth muscle tissues is the
 - (a) desmosome
 - (b) basement membrane
 - (c) tight junction
 - (d) gap junction
 24. The most abundant connections between cells in the superficial layers of the skin are
 - (a) connexons
 - (b) gap junctions
 - (c) desmosomes
 - (d) tight junctions
 25. _____ membranes have an epithelium that is incomplete and atypical.
 - (a) Cutaneous
 - (b) Serous
 - (c) Synovial
 - (d) Mucous
 26. Mucous secretions that coat the passageways of the digestive and respiratory tracts result from _____ secretion.
 - (a) apocrine
 - (b) merocrine
 - (c) holocrine
 - (d) endocrine

27. The type of tissue that contains a fluid known as the ground substance is
 - (a) epithelial
 - (b) neural
 - (c) muscle
 - (d) connective
28. The three basic types of fibers in connective tissue are
 - (a) tendons, ligaments, and elastic ligaments
 - (b) loose, dense, and irregular
 - (c) cartilage, bone, and collagen
 - (d) collagen, reticular, and elastic
29. The three types of loose connective tissue are
 - (a) collagen, reticular, and elastic
 - (b) areolar, adipose, and reticular
 - (c) collagen, bone, and cartilage
 - (d) fluid, supporting, and connective tissue proper
30. Two major examples of dense regular connective tissue are
 - (a) cartilage and bone
 - (b) elastic tissue and bone
 - (c) tendons and elastic tissue
 - (d) collagen and tendons
31. The three major types of cartilage in the body are
 - (a) collagen, reticular, and elastic
 - (b) areolar, adipose, and reticular
 - (c) hyaline, elastic, and fibrocartilage
 - (d) tendons, reticular, and elastic
32. The primary function of serous membranes in the body is
 - (a) to minimize friction between opposing surfaces
 - (b) to line cavities that communicate with the exterior
 - (c) to perform absorptive and secretory functions
 - (d) to cover the surface of the body
33. The layer of areolar tissue that separates the skin from underlying tissues and organs is the
 - (a) superficial fascia
 - (b) subcutaneous layer
 - (c) hypodermis
 - (d) a, b, and c are correct
34. Intercalated discs and pacemaker cells are characteristic of
 - (a) smooth muscle tissue
 - (b) cardiac muscle tissue
 - (c) skeletal muscle tissue
 - (d) a, b, and c are correct
35. Axons, dendrites, and a cell body are characteristics of cells located in
 - (a) neural tissue
 - (b) muscle tissue
 - (c) connective tissue
 - (d) epithelial tissue
36. The repair process necessary to restore normal function in damaged tissues is
 - (a) isolation
 - (b) regeneration
 - (c) reconstruction
 - (d) a, b, and c are correct
37. What are the four major characteristics of epithelial tissue?
38. What are the four essential functions of epithelial tissue?
39. Which three types of cell junctions serve as cellular attachments in the body?
40. What three types of layering make epithelial tissue recognizable?
41. What three cell shapes describe almost every epithelium in the body?

BIOLOGY II
CARDIOVASCULAR SYSTEM
ACTIVITY #3

NAME _____
DATE 5/4-5/8 HOUR _____

THE HEART

OBJECTIVES:

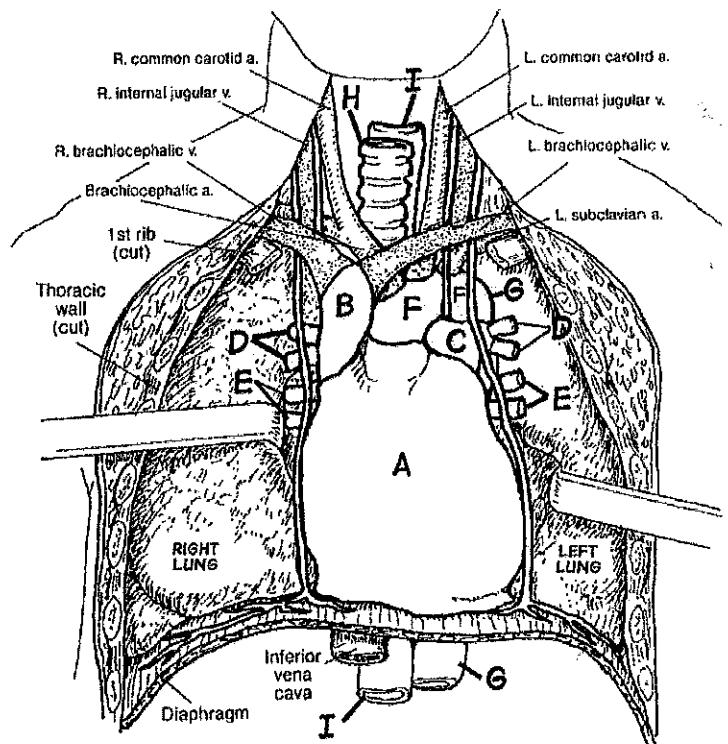
- Describe the anatomy of the heart and identify and give the functions of all parts. (pp. 356 - 363)
- Trace the flow of blood through the heart, identifying all major blood vessels and heart chambers. (pp. 356 - 363)

LOCATION OF THE HEART IN THE THORACIC CAVITY

The heart is a cone-shaped organ approximately the size of a fist and is located within the mediastinum, or medial cavity, of the thorax. It is flanked laterally by the lungs, posteriorly by the vertebral column, and anteriorly by the sternum. Its more pointed **apex** extends slightly to the left and rests on the diaphragm, approximately at the level of the fifth intercostal space. Its broader **base**, from which the great vessels emerge, lies beneath the second rib and points toward the right shoulder. *In situ*, the right ventricle of the heart forms most of the anterior surface.

1. The drawing at the right shows the heart within the chest cavity. Color the following parts on the diagram.

- Pericardium-covered heart (A)
- Superior vena cava (B)
- Pulmonary trunk (C)
- Pulmonary artery (D)
- Pulmonary vein (E)
- Aortic arch (F)
- Thoracic aorta (G)
- Trachea (H)
- Esophagus (I)

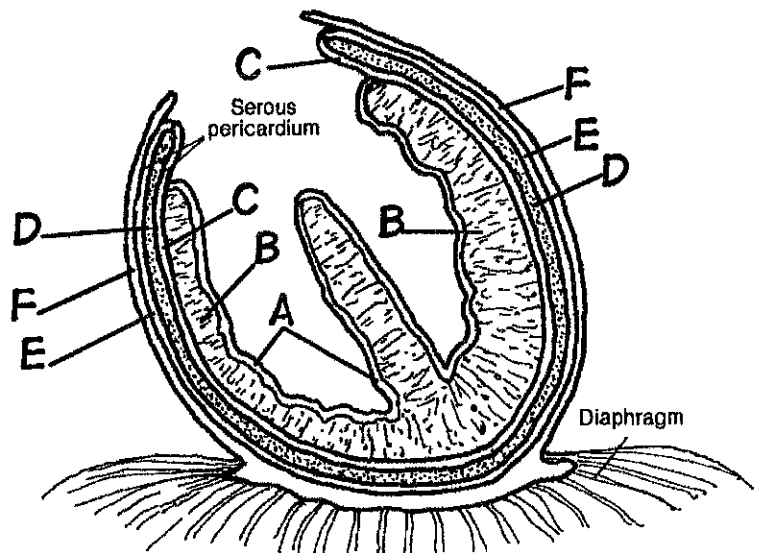


THE WALL OF THE HEART

The heart is enclosed within a double - walled fibrous sac called the **pericardium**. The thin **visceral pericardium**, or **epicardium**, which is closely applied to the heart muscle, reflects downward at the base of the heart to form its companion serous membrane, the outer, loosely applied **parietal pericardium**, which is attached at the heart apex to the diaphragm. Serous fluid produced by these membranes allows the heart to beat in a relatively frictionless environment. The serous parietal pericardium lines the loosely fitting superficial **fibrous pericardium** composed of dense connective tissue. Inflammation of the pericardium, **pericarditis**, causes painful adhesions between the serous pericardial layers. These adhesions interfere with heart movements. The wall of the heart is composed primarily of cardiac muscle - the **myocardium** - which is reinforced internally by a dense fibrous connective tissue network. The **endocardium** is the thin, inner lining of the heart. It is composed of simple squamous epithelium and some connective tissue. The endocardium is continuous with the inner lining of the blood vessels.

2. The diagram at the right shows the wall of the heart and the pericardium. Color the following structures on the diagram.

- Endocardium (A)
- Myocardium (B)
- Visceral Pericardium (C)
- Pericardial cavity (D)
- Parietal pericardium (E)
- Fibrous pericardium (F)



3. What is the covering around the heart called?

4. What is the function of the fluid - filled sac surrounding the heart?

5. Identify the layer of the heart wall (**EPI**cardium, **MYO**cardium, or **ENDO**cardium) described below.

_____ Outer layer	_____ Also called visceral pericardium
_____ Thick muscular layer	_____ Middle layer
_____ Continuous with the inner lining of blood vessels	_____ Composed of simple squamous epithelium & some connective tissue
_____ Innermost layer	

HEART CHAMBERS & VALVES

The heart is divided into four chambers; two superior **atria** and two inferior **ventricles**, each lined with a thin serous lining called the **endocardium**. The septum that divides the heart longitudinally is referred to as the **interatrial** or **interventricular septum**, depending on which chambers it separates. Functionally, the atria are receiving chambers and are relatively ineffective as pumps. Blood flows into the atria under low pressure from the veins of the body. The right atrium receives relatively oxygen-poor blood from the body via the **superior** and **inferior vena cava**. Four **pulmonary veins** deliver oxygen-rich blood from the lungs to the left atrium

The inferior thick-walled ventricles, which form the bulk of the heart, are the discharging chambers. They force blood out of the heart into the large arteries that emerge from its base. The right ventricle pumps blood into the **pulmonary trunk**, which routes blood to the lungs to be oxygenated. The left ventricle discharges blood into the **aorta**, from which all systemic arteries of the body diverge to supply the body tissues.

Four valves enforce a one-way blood flow through the heart chambers. The **atrioventricular (AV) valves**, located between the atrial and ventricular chambers on each side, prevent backflow into the atria when the ventricles are contracting. The left atrioventricular valve, also called the **mitral** or **bicuspid valve**, consists of two cusps, or flaps, of endocardium. The right atrioventricular valve, the **tricuspid valve**, has three cusps. Tiny white collagenous cords called the **chordae tendineae** (literally, heart strings) anchor the cusps to the ventricular walls. The chordae tendineae originate from small bundles of cardiac muscle, called **papillary muscles**, project from the myocardial wall.

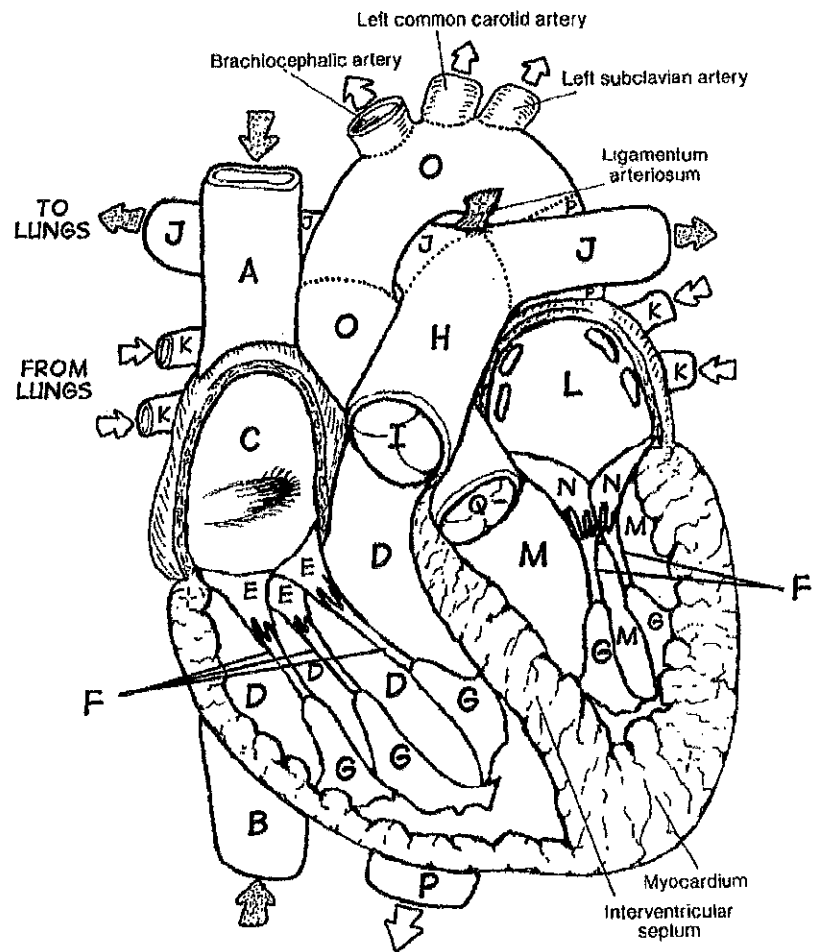
When blood is flowing passively into the atria and then into the ventricles during **diastole** (the period of ventricular relaxation), the atrioventricular valve flaps hang limply in the ventricular chambers and then are carried passively toward the atria by the accumulating blood. When the ventricles contract (**systole**) and compress the blood in their chambers, the intraventricular blood pressure rises causing the valve flaps to be reflected superiorly, which closes the AV valves. The chordae tendineae, pulled taut by the contracting papillary muscles, anchor the flaps in a

closed position preventing backflow into the atria during ventricular contraction. If unanchored, the flaps would blow upward into the atria rather like an umbrella being turned inside out by a strong wind.

The second set of valves, the **pulmonary** and **aortic semilunar valves**, each composed of three pocket-like cusps, guards the bases of the two large arteries leaving the ventricular chambers. The valve cusps are forced open and flatten against the walls of the artery as the ventricles discharge their blood into the large arteries during systole. However, when the ventricles relax, blood flows backward toward the heart and the cusps fill with blood, closing the semilunar valves and preventing arterial blood from reentering the heart.

6. The drawing below shows the internal structures of the heart and the great vessels attached to the heart. Color the following parts on the diagram.

- Superior vena Cava (A)
- Inferior vena cava (B)
- Right atrium (C)
- Right ventricle (D)
- Tricuspid valve (E)
- Chordae tendineae (F)
- Papillary muscle (G)
- Pulmonary trunk (H)
- Pulmonary semilunar valve (I)
- Pulmonary artery (J)
- Pulmonary vein (K)
- Left atrium (L)
- Left ventricle (M)
- Bicuspid (mitral) valve (N)
- Aortic arch (O)
- Thoracic aorta (P)
- Aortic semilunar valve (Q)



7. What is the function of the valves inside the heart?

8. Complete the following by filling in the blanks with the correct heart valve.
- The _____ prevents backflow of blood from the right ventricle into the right atrium. The _____ prevents back flow of blood from the left ventricle into the left atrium. The _____ prevents back flow of blood from the aorta into the left ventricle. The _____ prevents back flow of blood from the pulmonary trunk into the right ventricle.
9. Describe what happens during:
- a. Diastole. _____

- b. Systole. _____

MAMMALIAN (SHEEP) HEART EXAMINATION

10. Ventral View: Place the heart in the position shown in Sheep Heart Diagrams pages 1 - 3. This is the ventral side of the heart. The line running diagonally down from the right side (facing you) of the heart to the bottom left side is the **coronary artery**. The coronary artery supplies blood to the heart muscle tissue. The pointed bottom of the heart is called the **apex**. Hearts from packing houses usually come with the major blood vessels trimmed very close to the heart itself. Although this is less than ideal, identification of the vessels and their entrances into the heart can easily be accomplished. Use Sheep Heart Diagram #1 to help you identify the following structures on the heart:
- | | |
|------------------------|-----------------------|
| Superior vena cava | Pulmonary artery |
| Inferior vena cava | Pulmonary veins |
| Right auricle (atrium) | Left auricle (atrium) |
| Right ventricle | Left ventricle |
| Brachiocephalic artery | |
11. Dorsal View: Compare your heart to the heart in Sheep Heart Diagrams pages 4 - 6 and identify all the structures illustrated.

12. Internal Structures: The heart has already been cut into two sections. Separate the two halves of the heart and identify the following structures. Use Sheep Heart Diagram page 7 for help.

Right atrium & ventricle
Left atrium & ventricle
Interventricular septum
Tricuspid valve
Bicuspid (mitral) valve

Aortic & pulmonary semilunar valves
Chordae tendineae
Papillary muscle

13. Examine Sheep Heart Diagram page 8. Match the structure below with the correct letter from the diagram.

_____ Aorta
_____ Brachiocephalic artery
_____ Coronary artery
_____ Left atrium

_____ Left ventricle
_____ Pulmonary artery
_____ Right atrium
_____ Right ventricle

14. Examine Sheep Heart Diagram page 9. Match the structure below with the correct letter from the diagram.

_____ Aorta
_____ Brachiocephalic artery
_____ Coronary artery
_____ Inferior vena cava
_____ Left ventricle

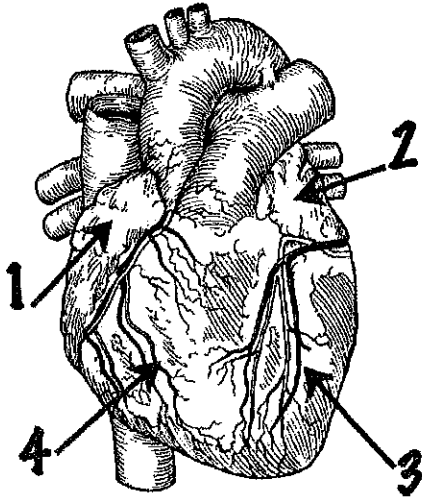
_____ Pulmonary artery
_____ Pulmonary vein
_____ Right atrium
_____ Right ventricle
_____ Superior vena cava

15. Examine Sheep Heart Diagram page 10. Match the structure below with the correct letter from the diagram.

_____ Chordae tendineae
_____ Left atrium
_____ Left ventricle
_____ Mitral valve
_____ Papillary muscle
_____ Right atrium

_____ Right ventricle
_____ Septum
_____ To aorta
_____ To Pulmonary artery
_____ Tricuspid valve

16. Identify the parts on the following diagrams.



1. _____

2. _____

3. _____

4. _____

5. _____

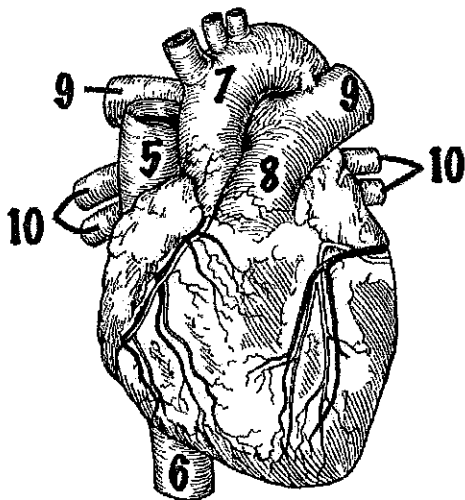
6. _____

7. _____

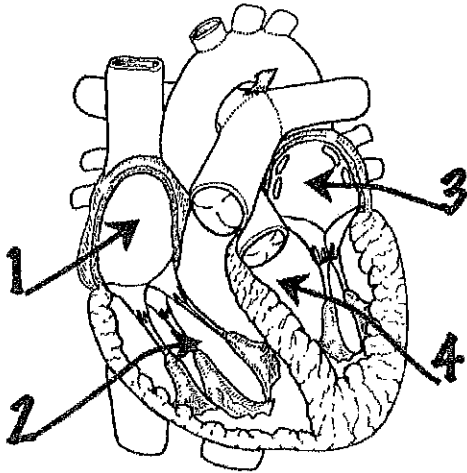
8. _____

9. _____

10. _____



17. Identify the parts on the following diagrams.



1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

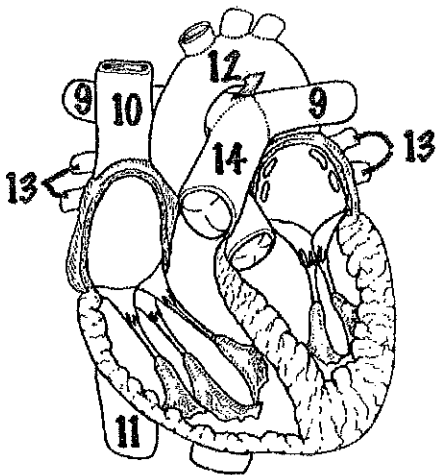
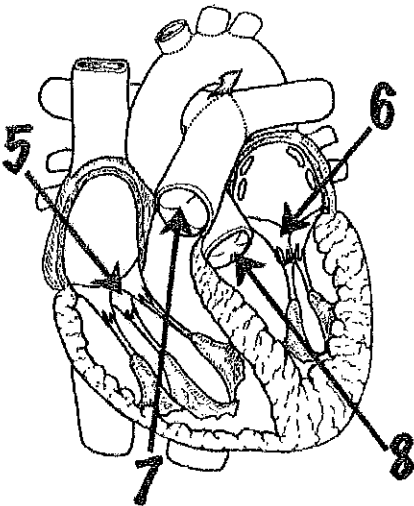
10. _____

11. _____

12. _____

13. _____

14. _____

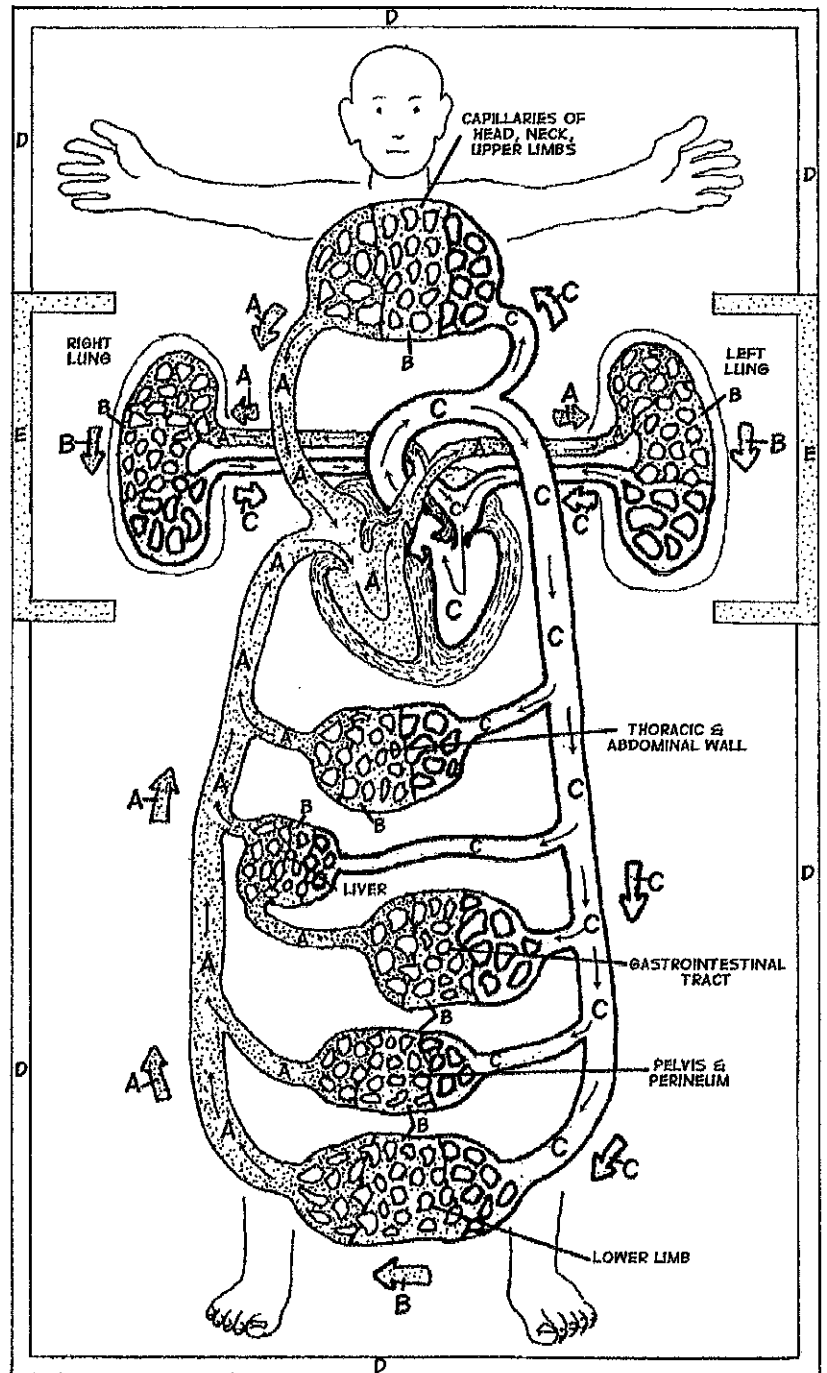


PULMONARY AND SYSTEMIC CIRCULATION

The heart functions as a double pump. The right side serves as the **pulmonary circulation** pump, shunting the carbon dioxide - rich blood entering its chambers to the lungs to unload carbon dioxide and pick up oxygen, and then back to the left side of the heart. The function of this circuit is strictly to provide for gas exchange. The second circuit, which carries oxygen - rich blood from the left heart through the body tissues and back to the right heart is called the **systemic circulation**. It supplies the functional blood supply to all body tissues.

18. Color the following parts on the diagram at the right.

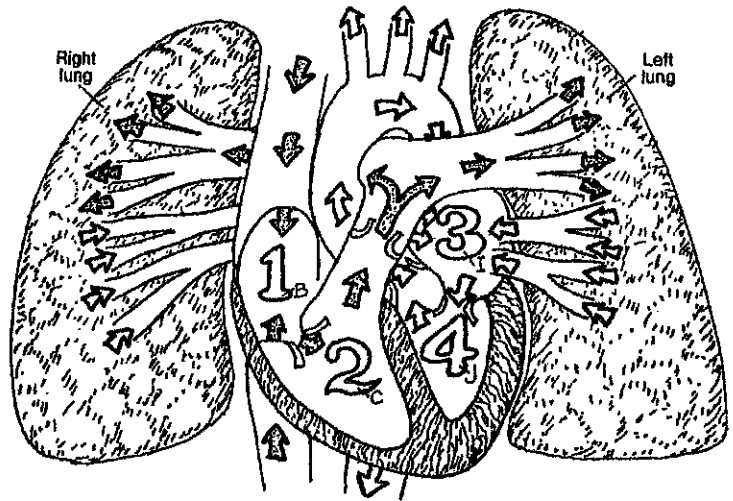
- Deoxygenated blood (A)
- Capillary blood (B)
- Oxygenated blood (C)
- Systemic circulation (D)
- Pulmonary circulation (E)



CIRCULATION THROUGH THE HEART*

OXYGENATED BLOOD → H⁺
 DEOXYGENATED BLOOD → A⁺

19. Trace the path of blood through the heart by coloring the arrows on the diagram at the right. The shaded arrows show the path of deoxygenated blood. Use **blue** to color the shaded arrows. The other arrows show the path of oxygenated blood. Use **red** to color these arrows.



20. Identify the type of blood (**O**xygenated or **D**eoxygenated) carried or pumped by each of the following structures. Use the drawing in #19 for help.

- | | |
|--------------------------------|--------------------------|
| _____ Aorta | _____ Pulmonary veins |
| _____ Inferior vena cava | _____ Right atrium |
| _____ Left atrium | _____ Right ventricle |
| _____ Left ventricle | _____ Superior vena cava |
| _____ Pulmonary trunk/arteries | |

21. Identify the heart chambers represented by the numbers in the drawing from #19.

- | | |
|----------|----------|
| 1. _____ | 3. _____ |
| 2. _____ | 4. _____ |

22. Use the word list below to complete the following.

Aorta
Inferior vena cava
Left atrium
Left ventricle
Pulmonary arteries

Pulmonary veins
Right atrium
Right ventricle
Superior vena cava

The _____ and _____
carry blood into the right atrium. The _____ pumps
blood into the right ventricle. The _____ pumps
blood into the pulmonary trunk. The _____ carry
blood to the lungs. The _____ carry blood to the
left atrium. The _____ pumps blood into the left
ventricle. The _____ pumps blood into the aorta.
The _____ carries blood to the body.