I. Introduction

A. The heart pumps 7,000 liters of blood through the body each day.

B. The cardiovascular system includes the heart and blood vessels.

C. The pulmonary circuit sends oxygen-depleted blood to the lungs to pick up oxygen and unload carbon dioxide.

D. The systemic circuit sends oxygen-rich blood and nutrients to the body cells and removes wastes.
II. Structure of the Heart

A. Size and Location of the Heart

1. An average size of an adult heart is generally 14 cm long and 9 cm wide.

2. The heart is bounded laterally by the lungs, anteriorly by the sternum, and posteriorly by the vertebral column.

3. The base of the heart lies beneath the second rib.

4. The apex of the heart is at the level of the fifth intercostal space.
B. Coverings of the Heart

1. The pericardium is a covering that encloses the heart and the proximal ends of the large blood vessels to which it attaches.

2. The fibrous pericardium is the outer fibrous layer of the pericardium.

3. The visceral pericardium is a serous membrane that is attached to the surface of the heart.

4. The parietal pericardium is a serous membrane that lines the fibrous layer of the pericardium.

5. The pericardial cavity is the space between the visceral pericardium and parietal pericardium.

6. Serous fluid reduces friction between the pericardial membranes as the heart moves.
C. Wall of the Heart

- 1. The three layers of the heart wall are endocardium, myocardium, and pericardium.
- 2. The epicardium is composed of a serous membrane that consists of connective tissue covered by epithelium, and it includes blood capillaries, lymph capillaries, and nerve fibers.
- 3. The middle layer is the myocardium.
- 4. The myocardium is composed of cardiac muscle tissue.
- 5. The inner layer is the endocardium.
6. The endocardium consists of epithelium and connective tissue that contains many elastic and collagenous fibers. It also contains blood vessels and Purkinje fibers.

7. The endocardium of the heart is continuous with the inner lining of the blood vessels attached to the heart.
D. Heart Chambers and Valves

- 1. The two upper chambers of the heart are the right atrium and the left atrium.
- 2. Auricles are small, earlike projections of the atria.
- 3. The two lower chambers of the heart are the right ventricle and the left ventricle.
- 4. The interatrial septum separates the right and left atrium.
D. Heart Chambers and Valves

- 5. The interventricular septum separates the right and left ventricles.
- 6. An atrioventricular orifice is an opening between an atrium and a ventricle.
- 7. An atrioventricular orifice is protected by an A-V valve.
- 8. The atrioventricular sulcus is located between the atria and ventricles.
- 9. The right atrium receives blood from the superior and inferior venae cavae and the coronary sinus.
D. Heart Chambers and Valves

- 10. The tricuspid valve is located between the right atrium and right ventricle and functions to prevent the back flow of blood into the right atrium.
- 11. Chordae tendinae are fibrous strings and function to prevent cusps of A-V valves from swinging back into atria.
- 12. Papillary muscles are located in ventricular walls and contract when the ventricles contract.
- 13. The right ventricle receives blood from the right atrium.
14. The right ventricle pumps blood into the pulmonary trunk.

15. The pulmonary trunk divides into pulmonary arteries.

16. Pulmonary arteries deliver blood to the lungs.

17. The pulmonary valve is located between the right ventricle and pulmonary trunk and opens when the right ventricle contracts.

18. Pulmonary veins carry blood from the lungs to the left atrium.
D. Heart Chambers and Valves

- 19. Blood passes from the left atrium into the left ventricle.
- 20. The mitral valve is located between the left atrium and left ventricle and functions to prevent the back flow of blood into the left atrium.
- 21. The left ventricle pumps blood into the aorta.
- 22. The aortic valve is located between the left ventricle and aorta and opens when the left ventricle contracts.
- 23. The tricuspid and mitral valves are also called A-V valves because they are positioned between atria and ventricles.
- 24. The pulmonary and aortic valves are also called semilunar valves because of their structures.