



**Distance Learning Program**  
**Anatomy of the Human Heart/Pig Heart Dissection**  
**Middle School/ High School**

This guide is for middle and high school students participating in AIMS Anatomy of the Human Heart and Pig Heart Dissections. Programs will be presented by an AIMS Anatomy Specialist. In this activity students will become more familiar with the anatomical structures of the human heart by observing, studying, and examining human specimens. The primary focus is on the anatomy and flow of blood through the heart. Those students participating in Pig Heart Dissections will have the opportunity to dissect and compare anatomical structures. At the end of this document, you will find anatomical diagrams, vocabulary review, and pre/post tests for your students.

**National Science Education (NSES) Content Standards for grades 9-12**

- Content Standard:K-12 ***Unifying Concepts and Processes*** :Systems order and organization; Evidence, models and explanation; Form and function
- Content Standard F, ***Science in Personal and Social Perspectives***: Personal and community health
- Content Standard C, ***Life Science***: Matter, energy and organization of living systems
- Content Standard A ***Science as Inquiry***

**National Science Education (NSES) Content Standards for grades 5-8**

- Content Standard A ***Science as Inquiry***
- Content Standard C, ***Life Science***: Structure and function in living systems; Diversity and adaptations of organisms
- Content Standard F, ***Science in Personal and Social Perspectives***: Personal Health

**Show Me Standards (Science and Health/Physical Education)**

- ***Science*** 3. Characteristics and interactions of living organisms
- ***Health/Physical Education*** 1. Structures of, functions of and relationships among human body systems

### **Objectives:**

The student will be able to:

1. Identify the chambers, valves and major vessels of the heart;
2. Observe the various structures of the heart;
3. Complete a dissection of a pig heart (applies to pig heart dissections only).

### **Lesson Objectives:**

This lesson will:

1. Allow students to observe the parts of the heart;
2. Increase the students understanding of the structures associated with the heart and the circulatory system;
3. Allow an opportunity for using comparative anatomy.

### **Materials:**

Textbook or resource materials with labeled pictures or diagrams of the heart

One per pair or group:

Preserved pig hearts

Dissecting tray

Scalpel

Forceps

Scissors

Probe

Related Websites:

Pig Heart Dissection

<http://heartlab.robarts.ca/dissect/dissection.html>

Pig Heart Dissection

[http://www.ymca-coll.edu.hk/biology/Photos/heart\\_dissection/](http://www.ymca-coll.edu.hk/biology/Photos/heart_dissection/)

## **Vocabulary Review**

### **“The Human Heart”**

**Pericardium** - double-layered membrane or serosa that surrounds the heart and roots of the great vessels.

**Coronary arteries** - the two arteries that branch from the base of the aorta and supply the heart muscle with oxygenated blood.

**Anterior interventricular artery** - a branch of the left coronary artery, which supplies blood to the interventricular septum and anterior walls of both ventricles.

**Right atrium** - chamber on the right side of the heart that receives oxygen-depleted blood returning to the heart from the superior vena cava, the inferior vena cava and the coronary sinus.

**Left atrium** - chamber on the left side of the heart that receives oxygenated blood from the pulmonary veins.

**Aorta** - the main trunk of systemic arterial circulation that arises from the left ventricle of the heart.

**Pulmonary trunk** - vessel that leaves the right ventricle and routes blood to the lungs where gas exchange occurs.

**Superior vena cava** - major vessel that returns oxygen-depleted blood to the right atrium of the heart from body regions superior to the diaphragm.

**Inferior vena cava** - major vessel that returns oxygen-depleted blood to the right atrium of the heart from body areas below the diaphragm.

**Fossa ovalis** - a shallow depression in the interatrial septum that marks the spot where an opening, the foramen ovale, existed in the fetal heart.

**Coronary sinus** - a vein which drains blood from the myocardium and routes it into the right atrium.

**SA node** - specialized myocardial cells in the wall of the right atrium that generate electrical impulses. The pacemaker of the heart.

**Right ventricle** - inferiorly-located chamber on the right side of the heart that receives oxygen depleted blood from the right atrium and pumps it to the lungs.

**Left ventricle** - inferiorly-located chamber on the left side of the heart that receives oxygenated blood from the left atrium and pumps it into the systemic circulation via the aorta.

**Tricuspid valve** - a three cusp valve that separates the right atrium from the right ventricle. It prevents backflow of blood into the right atrium when the right ventricle contracts.

**Chordae tendineae** - tendinous strings that extend from the cusps of the AV valves to the papillary muscles of the heart, thus preventing valve inversion.

**Papillary muscles** - conelike projections on the ventricular walls, to which the chordae tendineae are attached. The contraction of the papillary muscles and the tightening of the chordae tendineae prevent the valve flaps of the AV valves from everting into the atria.

**Pulmonary semilunar valves** - valve situated between the right ventricle and pulmonary artery, which guards the base of the pulmonary trunk and prevents backflow of blood into the right ventricle.

**Atrioventricular groove** - coronary groove or sulcus of the heart which demarcates the borders of the underlying atria from the ventricles.

**Mitral valve** - the valve connecting the left atrium and the left ventricle of the heart. Of the four heart valves, it is the only one with two cusps instead of three. It is also called the bicuspid valve.

**Pulmonary vein** - vessels which transport oxygenated blood from the lungs back to the heart.

**Aortic valve** - a valve at the opening between the left ventricle and the aorta, preventing the backflow of blood into the left ventricle.

**AV node** - specialized mass of conducting cells located at the atrioventricular junction in the heart.

**Diastole** - period of the cardiac cycle when either the ventricles or the atria are relaxing.

**Systole** - period when either the ventricles or the atria are contracting.

**Trabeculae carneae** - muscular ridges projecting from the walls of the ventricles of the heart.

**Pectinate muscles** - prominent muscular ridges that run along the inner surface of the auricle and across the adjacent anterior atrial wall.

**Arteries** - blood vessels that conduct blood away from the heart and into the circulation

**Veins** - blood vessels that return blood toward the heart from the circulation.

**Congestive heart failure (CHF)** - condition in which the pumping efficiency of the heart is depressed so that circulation is inadequate to meet tissue needs.

**Hypertension** - an elevation in diastolic or systolic blood pressure.

**Coronary artery disease (CAD)** - results from narrowing of the coronary arteries over time because of atherosclerosis.

**Atherosclerosis** - changes in the walls of large arteries consisting of lipid deposits on the artery walls; the early stage of arteriosclerosis.

**Myocardial infarction (MI)** - condition characterized by dead tissue areas in the myocardium; caused by interruption of blood supply to the area.

**Myocardium** - layer of the heart wall composed of cardiac muscle.

**Cardiac cycle** - sequence of events encompassing one complete contraction and relaxation of the atria and ventricles of the heart.

**AIMS**  
**Anatomy of the Human Heart**  
**Pre/Post Test**

1. The heart is composed of how many chambers? \_\_\_\_\_
2. The right side of the heart collects blood from \_\_\_\_\_, and sends it to the \_\_\_\_\_.
3. This vein brings blood from the upper extremities, head, neck, and brain, and deposits it in the right atrium. \_\_\_\_\_
4. This valve sits between the left atrium and the left ventricle \_\_\_\_\_. It is also known as \_\_\_\_\_.
5. The coronary arteries that supply the heart muscle with oxygenated blood, originate off of this vessel \_\_\_\_\_, just on the far side of this valve \_\_\_\_\_.
6. Significant blockage of a coronary artery will result in reduced blood flow to, and eventual death of the cells of the heart. The result of this blockage is called a \_\_\_\_\_.
7. Name three factors, within each person's control, that greatly affect the long-term health of your heart. \_\_\_\_\_  
\_\_\_\_\_
8. The healthy adult heart normally beats approximately how many times each minute? \_\_\_\_\_
9. Which side of the heart generates the greatest force to move blood?  
\_\_\_\_\_
10. This waxy, fat-like substance is found in the body and may contribute to heart disease by sticking to the walls of arteries. \_\_\_\_\_
11. These vessels carry blood away from the heart \_\_\_\_\_, while these vessels \_\_\_\_\_ carry blood toward the heart.
12. This is the name of a group of specialized cells, located within the wall of the right atrium, which initiates the human heart beat \_\_\_\_\_.

Bonus: Are you interested in a career in medicine, as either a doctor, nurse, or some other member of the healthcare community?  
Y or N

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**Pre/Post Test**  
**Answer Sheet**

- 1) four
- 2) body - lungs
- 3) superior vena cava
- 4) bicuspid - mitral valve
- 5) aorta - aortic
- 6) heart attack
- 7) diet, exercise, smoking
- 8) 72
- 9) Left
- 10) Cholesterol
- 11) Arteries - veins
- 12) SA node