HEART ANATOMY
High School

Location:
- The heart sits posterior to the sternum and costal cartilage and sits between ribs 2-5
- 2/3 of the heart sits to the left and 1/3 of the heart sits to the right of the median plane
- Apex of the heart lies posterior to the 5th left intercostals space
- Base of the heart faces posteriorly toward the bodies of T6-T9 vertebrae

Heart Position During Breathing:
- Inspiration
  - Heart becomes oblong, its apex is lowered
- Expiration
  - Heart increases its transverse diameter and becomes shorter (less oblong)

Layers of the Heart:
- **Pericardium** – surrounds the heart and the roots of the great blood vessels
  - **Fibrous Pericardium** – strong, dense, fibrous outer layer (what you see when you open the thoracic cage)
  - **Serous Pericardium** – inner layer
    - Parietal Layer – lines inner surface of fibrous pericardium
    - Visceral Layer – also called the Epicardium, forms outer layer, is directly on the surface of the heart
- **Pericarditis** – inflammation of the pericardium. It becomes inflamed and the amount of fluid between the layers increases which squeezes the heart and restricts its action.

Heart Anatomy:
- Dissected Hearts – Structures to Identify:
  - Right and Left Atria
  - Right and Left Ventricles – LV is much thicker than RV
  - Right Atrioventricular (Tricuspid) Valve and Left Atrioventricular (Bicuspid) Valve
- Pulmonary Semilunar Valve and Aortic Semilunar Valve
- Fossa Ovalis – between left and right atria, where the blood runs through the right and left atria before birth
- Crista Terminalis
- Pectinate Muscles
- Moderator Band – only in right heart, forms the bridge between intraventricular septum and papillary muscles, part of the conduction system
- Papillary Muscles – extend from ventricular walls and septum
- Chordae Tendinae – extend from valve cusps to papillary muscles, prevents backflow of blood into the atria
- Trabeculae Carnae – irregular muscular elevation on inferior part of right ventricle
- Right Auricle and Left Auricle – leftover from embryonic development
- Ligamentum Arteriosum – connects the arch of the aorta with the pulmonary trunk

Heart Anatomy:

- Dissected Hearts – Structures to Identify:
  - Vessels of the Heart
    - Superior and Inferior Vena Cava – dump into the Right Atrium
    - Aorta
      - Branch off Ascending Aorta
        - Right Coronary Artery
          - Right Marginal Artery
          - Posterior Interventricular Artery
        - Left Coronary Artery
          - Anterior Interventricular Artery
          - Circumflex Artery
    - Pulmonary Trunk with Pulmonary Arteries (DO$_2$)
    - Pulmonary Veins (O$_2$)
      - Great Cardiac Vein
      - Middle Cardiac Vein
      - Small Cardiac Vein
    - All 3 veins dump into the Coronary Sinus on the back of the heart
- Coronary Sinus – drains into the Right Atrium
  - Coronary Sulcus
    - Separates the 2 atria from the 2 ventricles
    - Contains the Right Coronary Artery, Small Cardiac Vein, Coronary Sinus, and Circumflex branch of Left Coronary Artery
  - Anterior Interventricular Groove
    - Separates the two ventricles on the front
    - Contains Anterior IV Artery and Great Cardiac Vein
  - Posterior Interventricular Groove
    - Separates the two ventricles on the back
    - Contains Posterior IV Artery and Middle Cardiac Vein
- Conduction System of the Heart
  - Sinoatrial (SA) Node – at junction of SVC and Right Atrium, known as the heart’s pacemaker
  - Atrioventricular (AV) Node – near the opening of the coronary sinus in Right Atrium
  - AV Bundle – splits into right and left branches
  - Purkinje Fibers – spread into the ventricle walls
Blood Flow through the Heart

- Aortic Semilunar Valve
- Bicuspid Valve
- Tricuspid Valve
- Pulmonary Semilunar Valve

Gas Exchange!

- Arteries
- Arterioles
- Veins
- Venules
- SVC and IVC
- Right Atrium
- Right Ventricle
- Left Atrium
- Left Ventricle
- Aorta
- Pulmonary Veins
- Pulmonary Arteries
- Lungs

Normal Heart

- Pulmonary Veins from Lungs
- Atrial Septum
- Pulmonary Valve
- Superior Vena Cava
- Inferior Vena Cava
- Mitral Valve
- Aortic Valve
- Ventricular Septum
- LV = Left Ventricle
- RA = Right Atrium
- AO = Aorta

Oxygen-rich Blood
Oxygen-poor Blood