Cardiovascular System Guide

Circulatory System:
- Consists of heart, blood vessels, blood
- Transports carbon dioxide and metabolic materials away from the body cells

The Heart:
- Muscular, hollow organ functions as pump
- Location:
- Three layers of tissue
  - Endocardium
  - Myocardium
  - Pericardium – pericardial fluid fills the space and prevents friction as the heart beats
- Septum –
- Heart chambers – 4,
  - Right atrium:
  - Right ventricle:
  - Left atrium:

Left ventricle:
Valves-
- Tricuspid-
- Pulmonary- between right ventricle and the pulmonary artery
- Mitral (biscupid)-
- Aortic-

Order of blood flow through the heart:
- Vena cavae
- Right atrium:
  - Tricuspid valve-
  - Right ventricle: receives blood from right atrium, pushes it out to pulmonary artery to go to the lungs
- Pulmonary valve-
- Left atrium: receives oxygenated blood from the lungs
- Mitral (biscupid)-
- Left ventricle: receives blood from the left atrium, pushes it into the aorta to go to the body
- Aortic-
- Aorta

The Heart:
- Cardiac cycle- right and left sides work together, electrical impulse originating in the heart causes myocardium to contract in a cyclical cycle:
  - rest/diastole;
  - ventricular contraction/systole; systole begins and ventricles contract (right ventricle pushes blood into pulmonary artery, left ventricle pushes blood into aorta)
- Blood pressure:
- Systole/diastole, pressure of heart against blood vessel walls when heart ventricles are contracting over/ the pressure of blood against the blood vessel walls when the heart is briefly resting and atria are refilling
- Written as a fraction: example, 120/80
- Conductive pathways- starts in SA node ( ) called the pacemaker, spreads impulse through muscles of the atria, reaches the AV node (Atrioventricular node) located between atria and ventricles, sends impulse through nerve fibers in the septum called the bundle of His, divides into right and left bundle branches along the walls of the ventricles, then subdivide into Purkinje fibers to all the muscle tissue in the ventricles. Then, the ventricles contract....
• Arrhythmias-
  • PAC- premature atrial contraction (mild, often unnoticed)
  • Ventricular fibrillation :
  •
  • Tachycardia-
  • Bradycardia- slow heart beat
• Treatment: depends on type of arrhythmia
  • defibrillator, can shock the heart back into rhythm by allowing the SA node to regain control
  • Pacemaker:
Blood is carried throughout the body in blood vessels—three main types:

- **Arteries**—Largest is the aorta, smallest arteries are arterioles
- **Capillaries**—

- **Veins**—carry blood back to the heart, have valves to keep blood from flowing backward, smallest are venules, largest are the superior and inferior vena cava which drain into the right atrium.

The Blood Vessels:

- Arteries—Carry blood away from the heart and have thick muscular walls that allow them to constrict and dilate in response to the body’s circulation needs
- Arterioles—
- Capillaries—
- Venules—
- Veins—Larger vessels responsible for transporting blood back to the heart
- Most arteries carry oxygenated blood with the exception of the coronary arteries. Most veins carry deoxygenated blood with the exception of the pulmonary veins.

Blood:
- Average adult:
  - Transports many substances
    - oxygen from lungs to body cells
    -
- nutrients from digestive tract to cells
- Heat (produced by various body parts)

Composition of blood:
- Plasma-
  - 90% water
  - Dissolve or suspended substances like:
    - Blood proteins:
    - Nutrients:
      - Mineral salts/electrolytes: potassium, calcium, sodium
    - Gases:
      - Metabolic and waste products
    - Hormones
- Blood cells-
  - Erythrocytes or red blood cells-
  - Leukocytes or white blood cells- formed in bone marrow and lymph tissue, 5,000 to 9,000 per cubic millimeter of blood, fight infection, produce antibodies
  - Thrombocytes- platelets, formed in bone marrow, important in clotting, normal count is 250,000 to 400,000 per cubic millimeter of blood.
White Blood Cells:

- **Neutrophils:** Phagocytize bacteria by secreting enzyme called lysozyme
- **Eosinophils:**
- **Basophils:** participate in the body's inflammatory process
- **Monocytes:**
- **Lymphocytes:** provide immunity for the body by developing antibodies; protect against formation of cancer cells