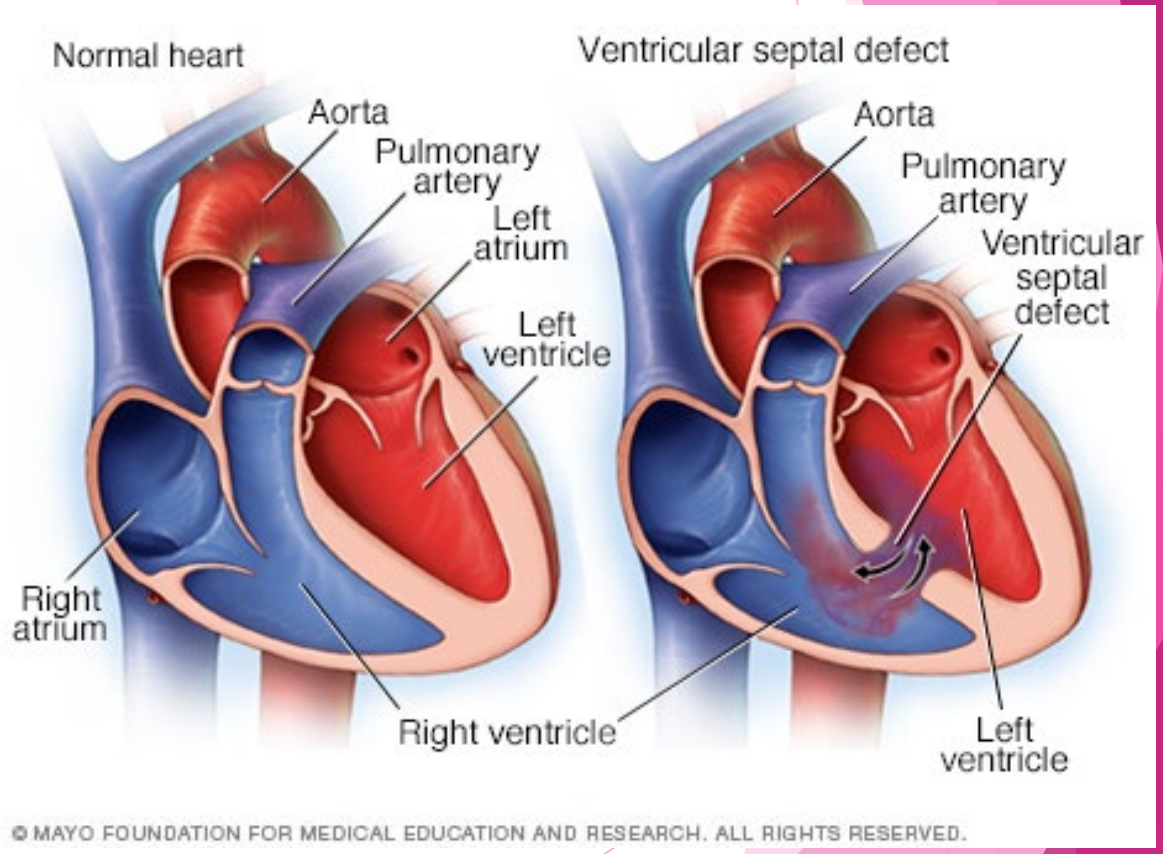
Heart

Science 30

Unit A



Curriculum:

- describe the principal structures and associated blood vessels of the heart; i.e., ventricles, atria, septum, valves (specific names of valves not required), aorta, vena cavae, pulmonary arteries and veins, coronary arteries

- map blood flow through a mammalian heart

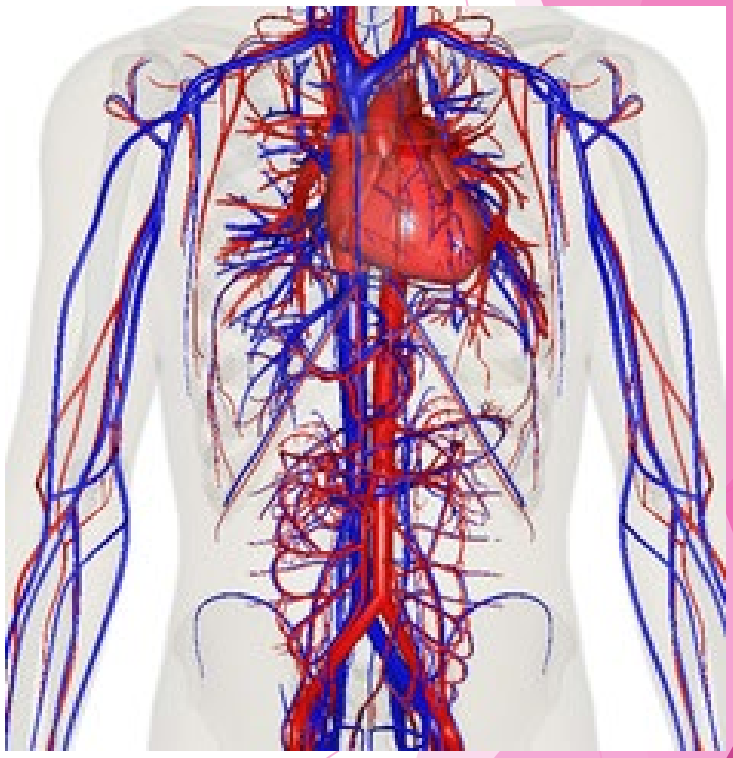
History of the Heart:

- Galen: Greek physician (2nd century)
  - Believed that heart sucked blood from veins, blood flowed like the tides.
- Leonardo da Vinci: 15th century
  - Experimented of cadavers and made detailed drawings of the heart
- William Harvey
  - Discovered valves in heart and veins, 1 way movement of blood
  - Calculated cardiac output
  - Aided by Malpighi's discovery of capillaries

Circulatory System:

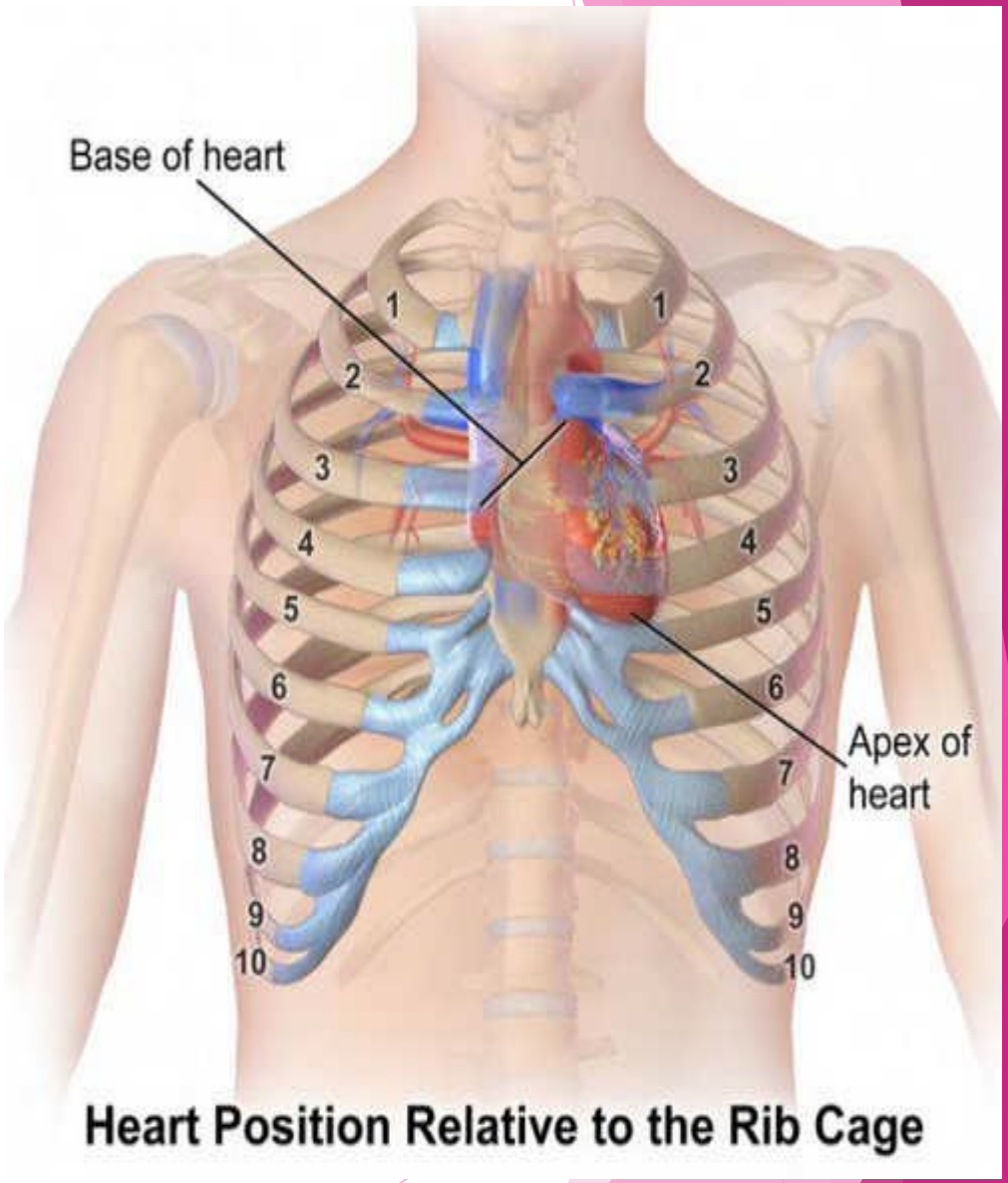
A system that carries blood away and towards the heart.

- 4 main roles of the circulatory system:
  - Transportation (gases, nutrients, wastes)
  - Regulation (by hormones)
  - Protection/Defense (immunity and injury)
  - Distributes body heat

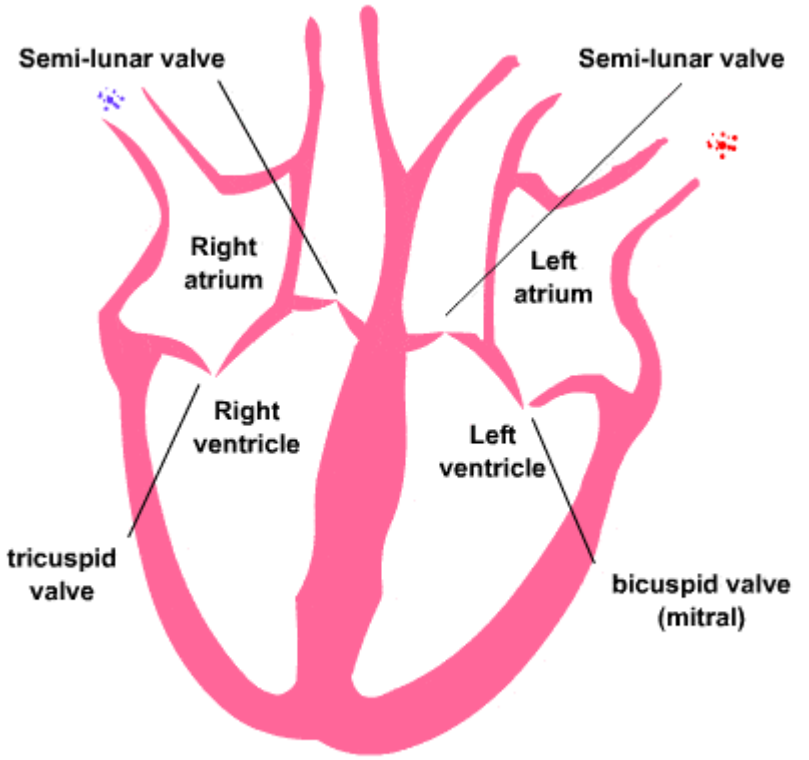


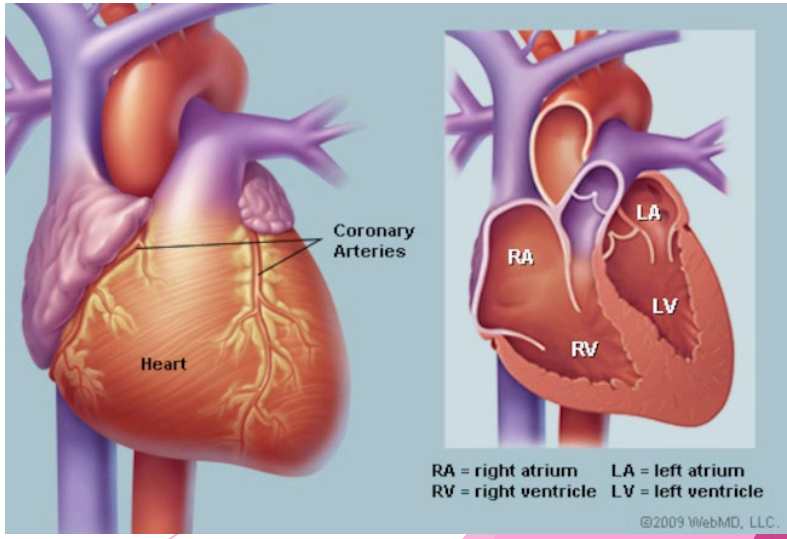
Heart

- Your heart is the size of your fist
- Located in the center of your chest
- Right behind the sternum bone

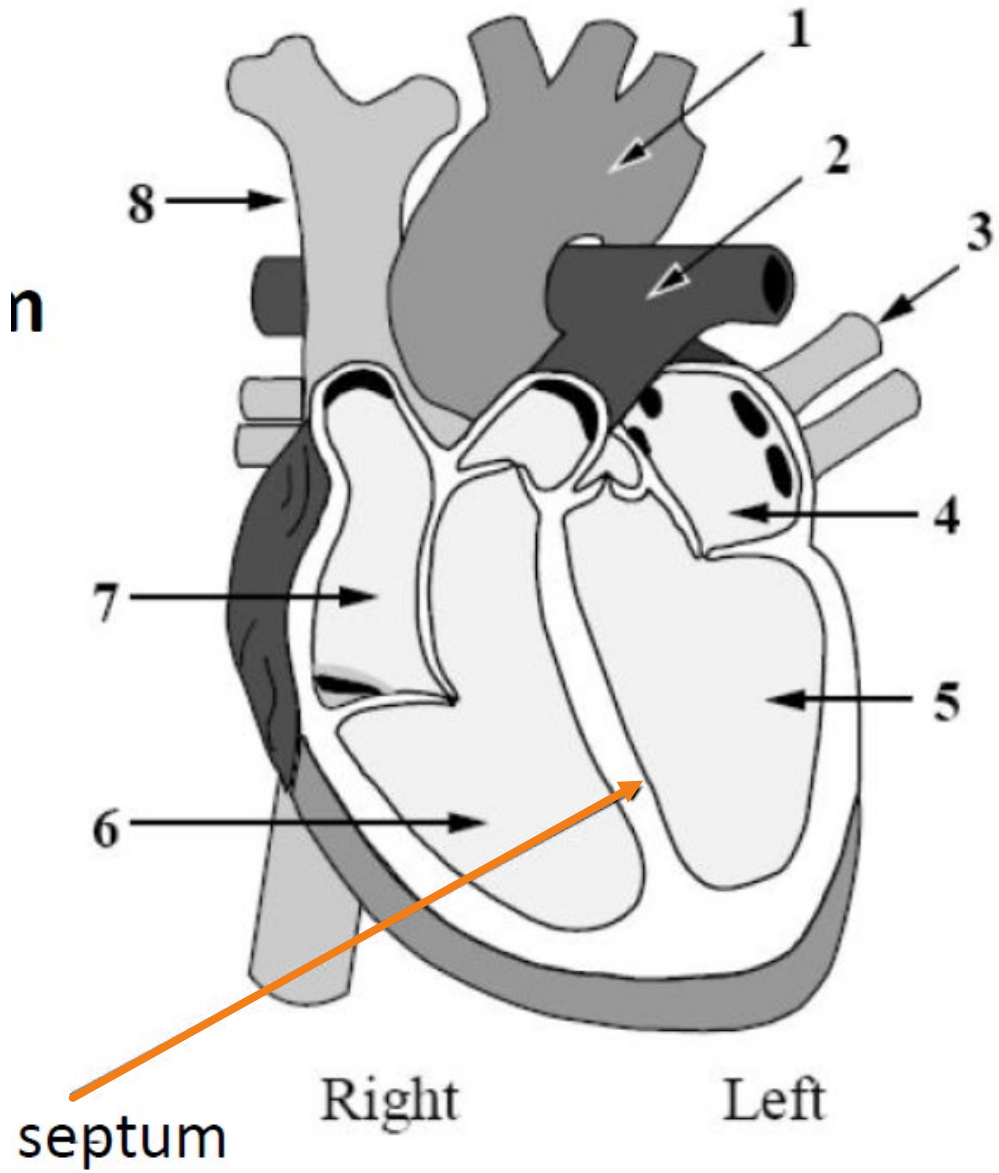


- There are 4 chambers in the heart:
  - **Left and Right atrium** (*receive* blood from lungs and body)
  - **Left and Right ventricles** (*pump* blood to lungs and body)

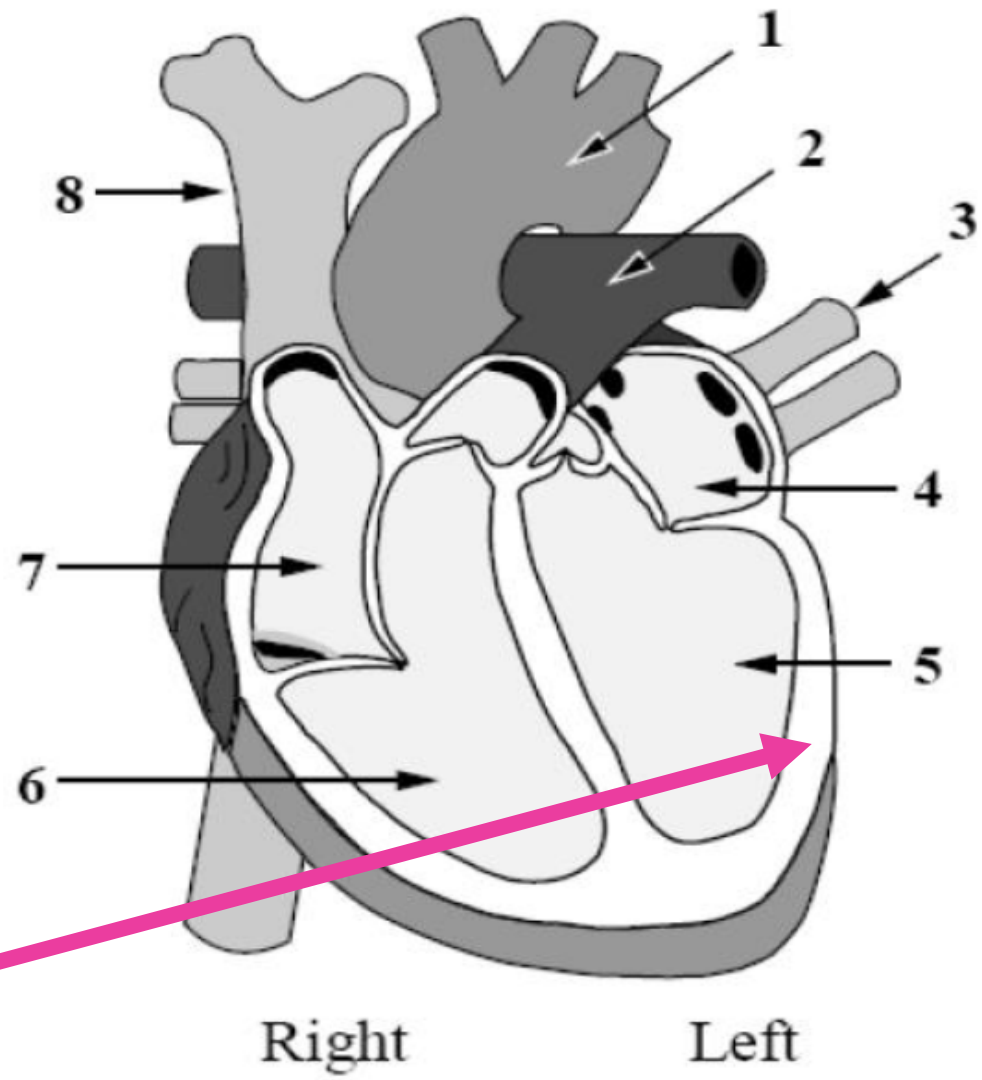




- Composed of two parallel pumps
- Separated by the **septum** (blood from either side never mixes)
- The right side pumps blood to the lungs
- The left rise pumps blood to the body



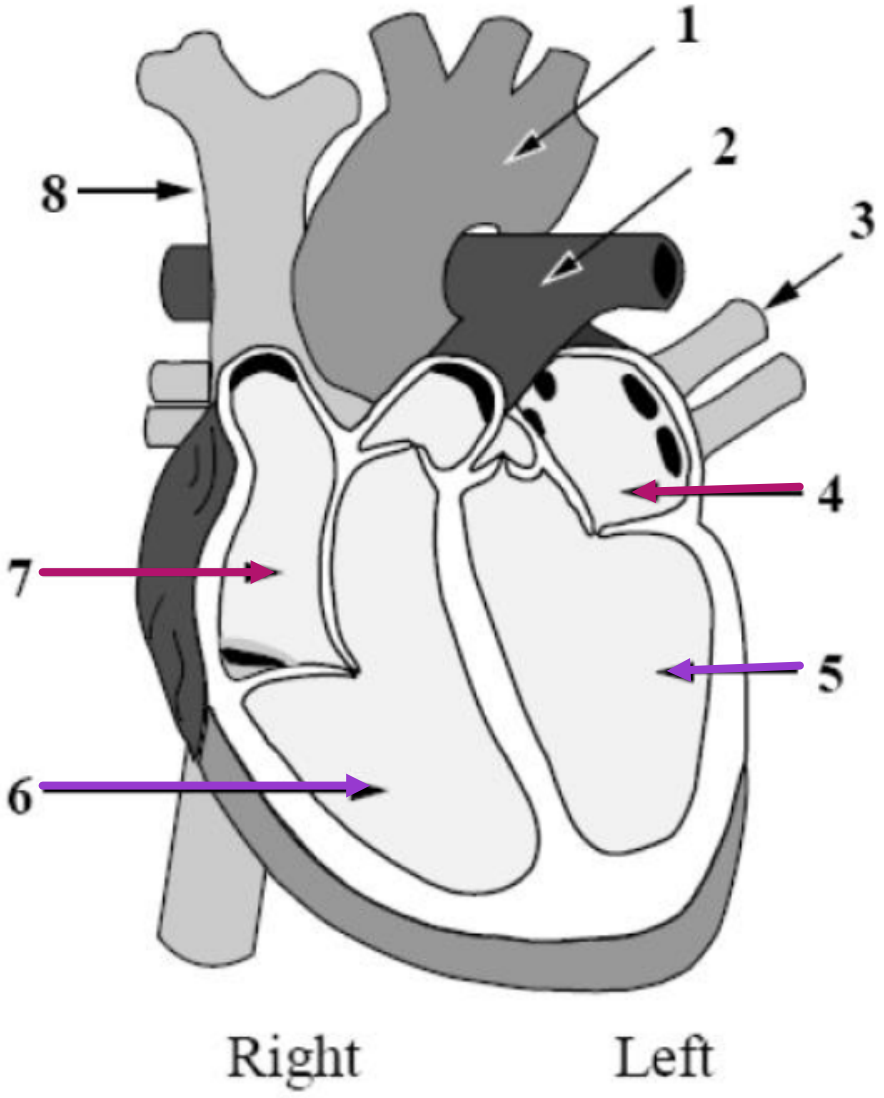
- Because the left ventral pumps blood to the whole body, it has a much more *muscular* wall.



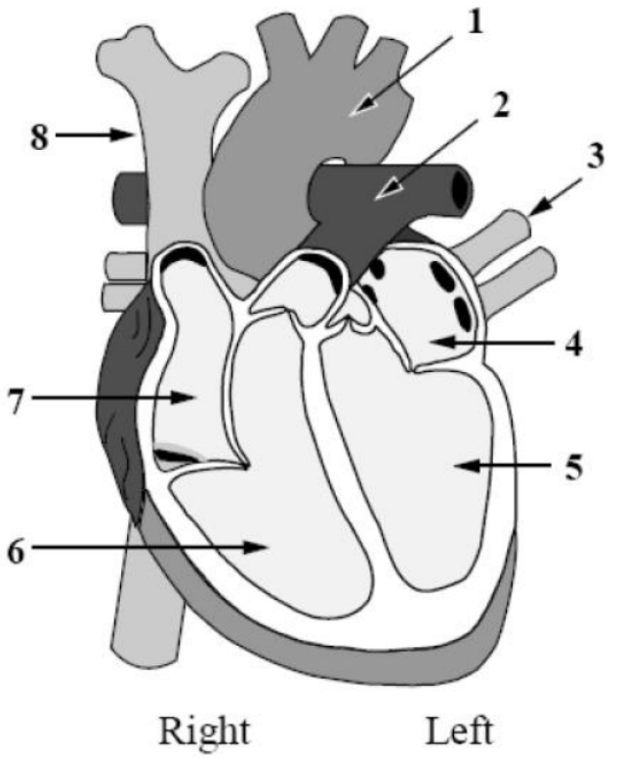
Thicker wall

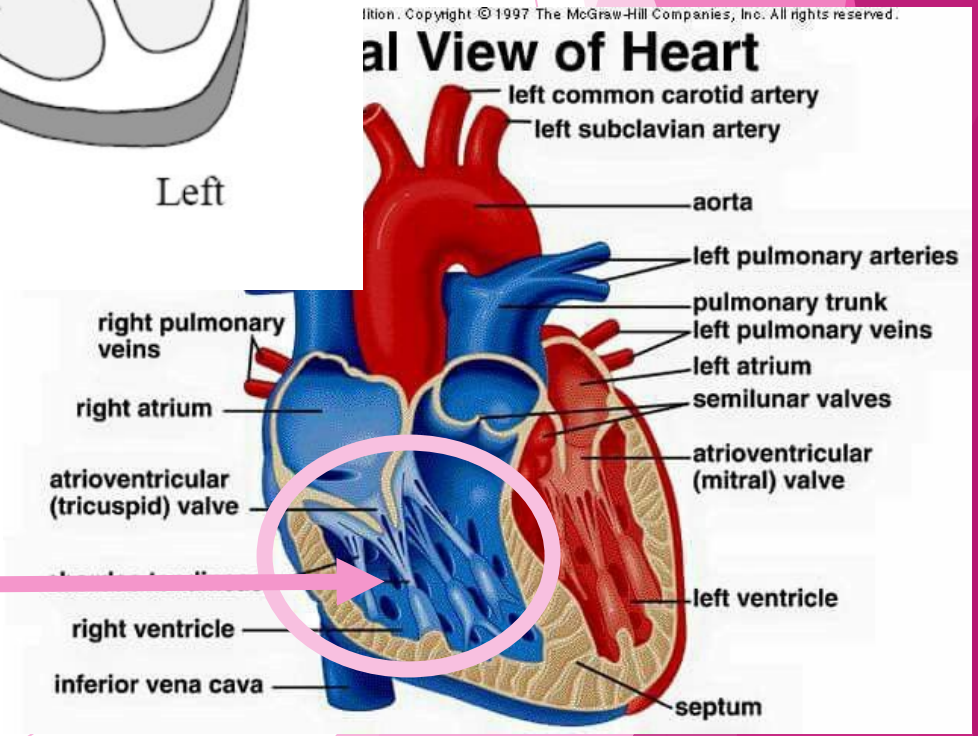
Each pump is composed of two chambers

- An atrium (#4, #7) welcomes blood to the heart
- A ventricle (#6 & #5) pumps blood out of the heart



- Valves connect the atria to the ventricles
- Valves allow blood to flow down only (from the atrium to ventricle)
  - Prevents backwards flow of blood
- The AV valves are supported by strings of tissue called chordae tendinae

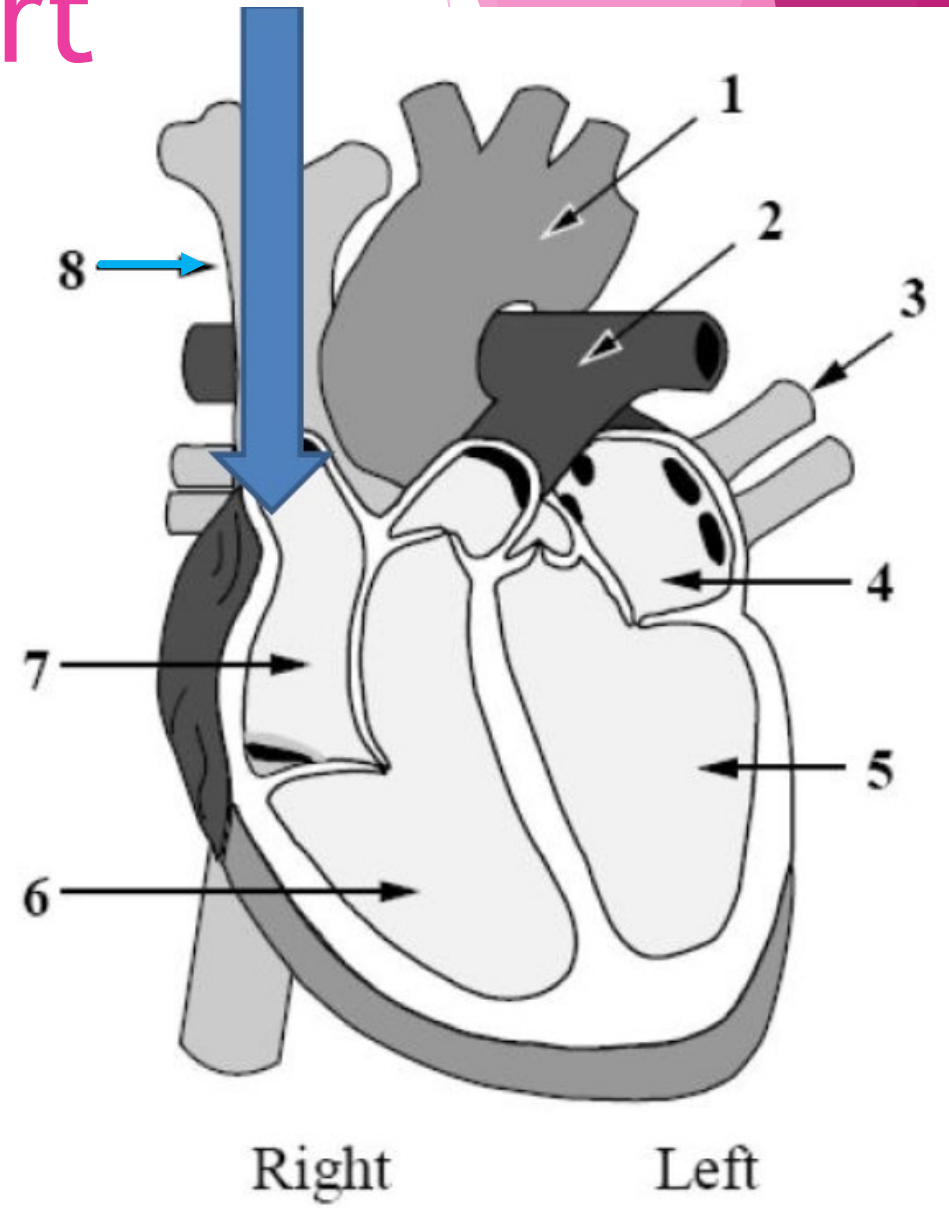




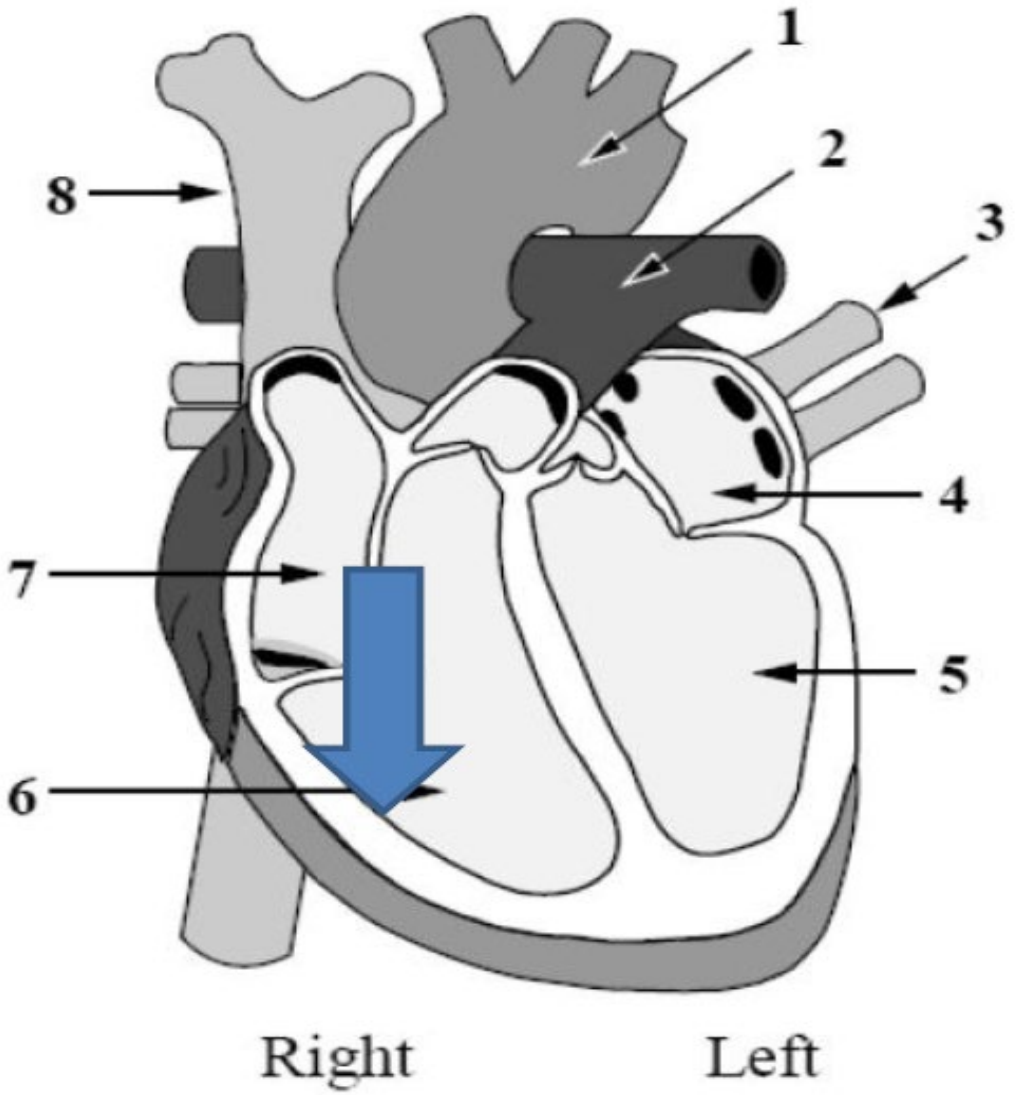
Blood Flow Through Heart

- Oxygen poor blood flows from body to heart in the vena cava (#8)

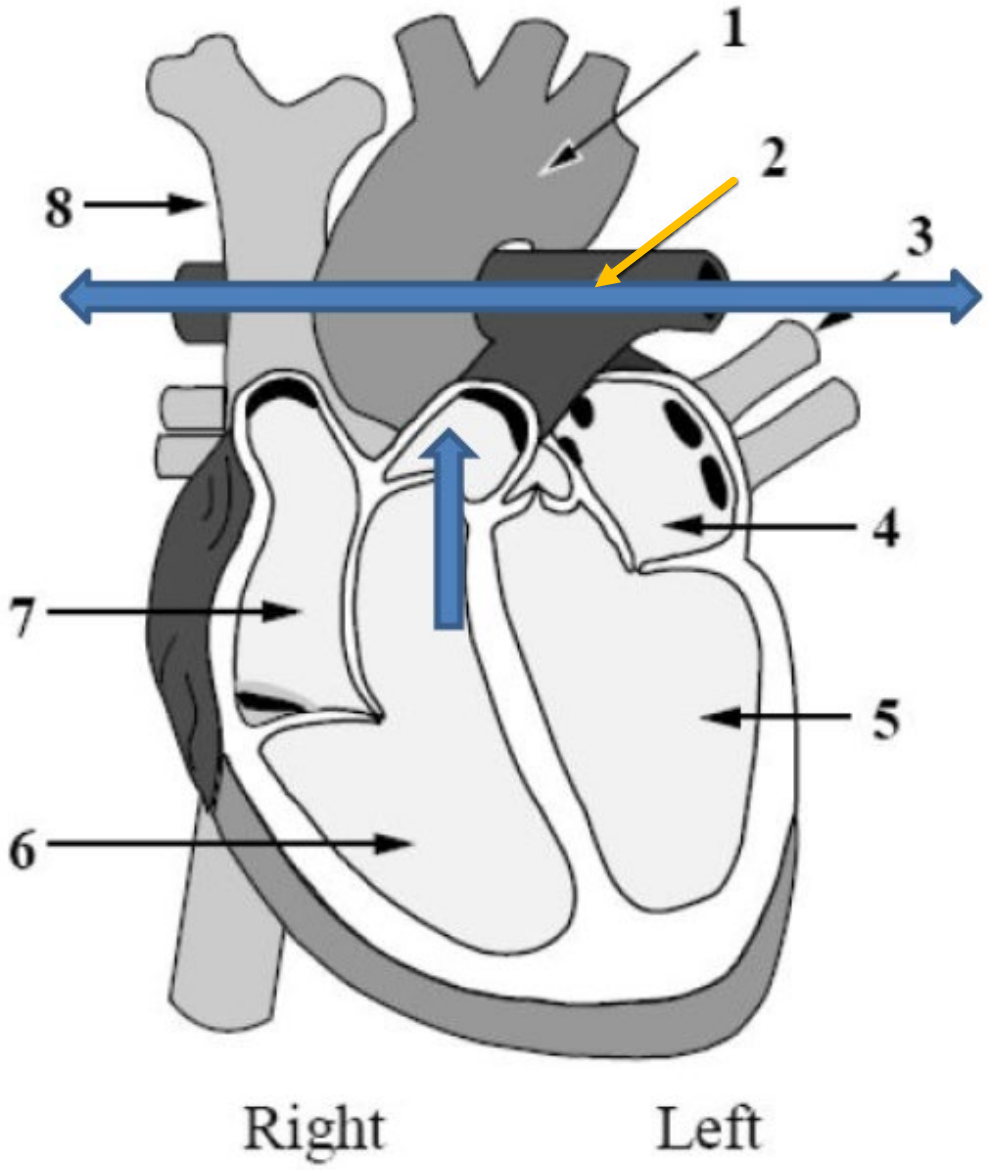
- Blood enters right atrium (#7)



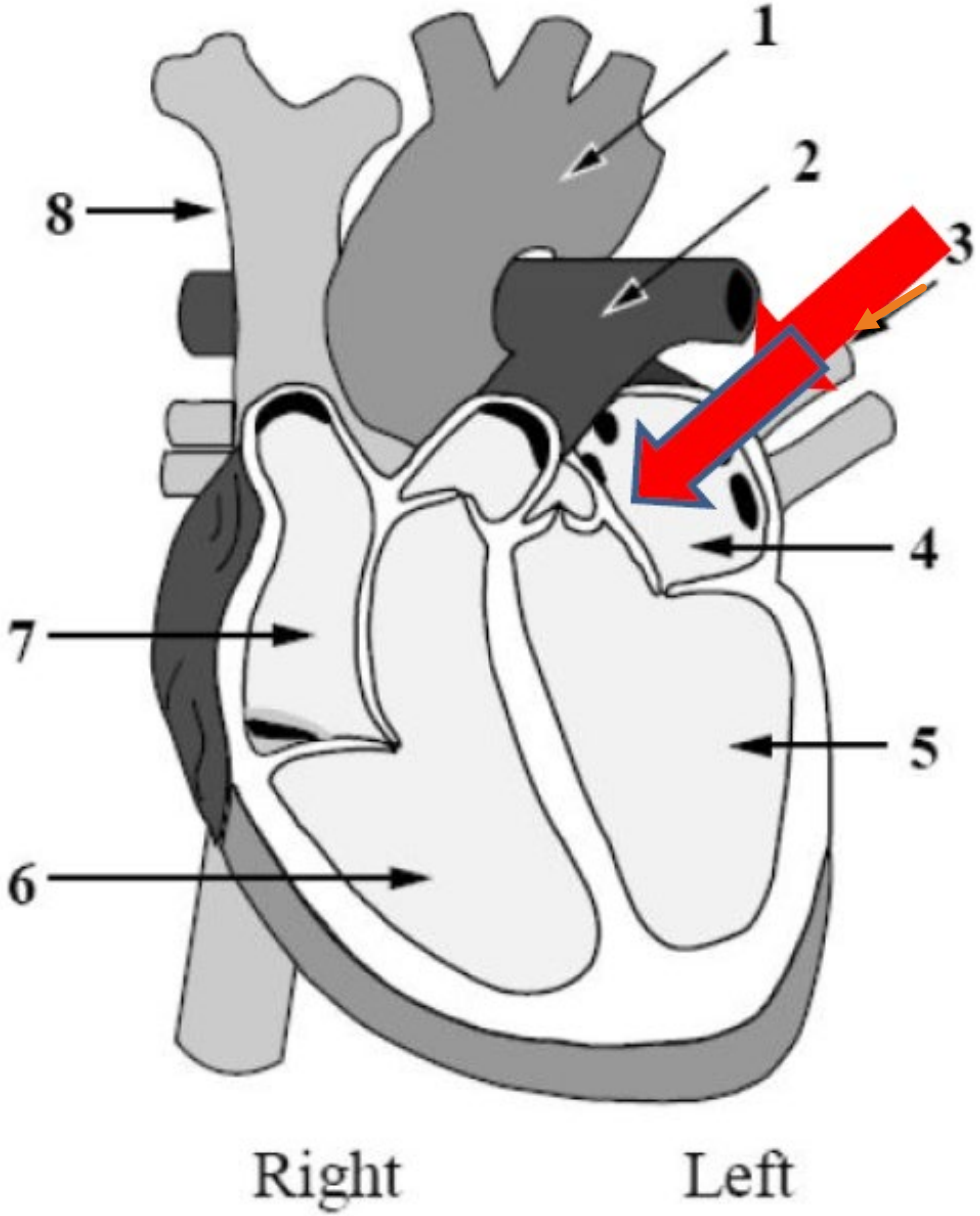
- Atrium (#7) contracts and blood flows to right ventricle (#6)
- Valve closes



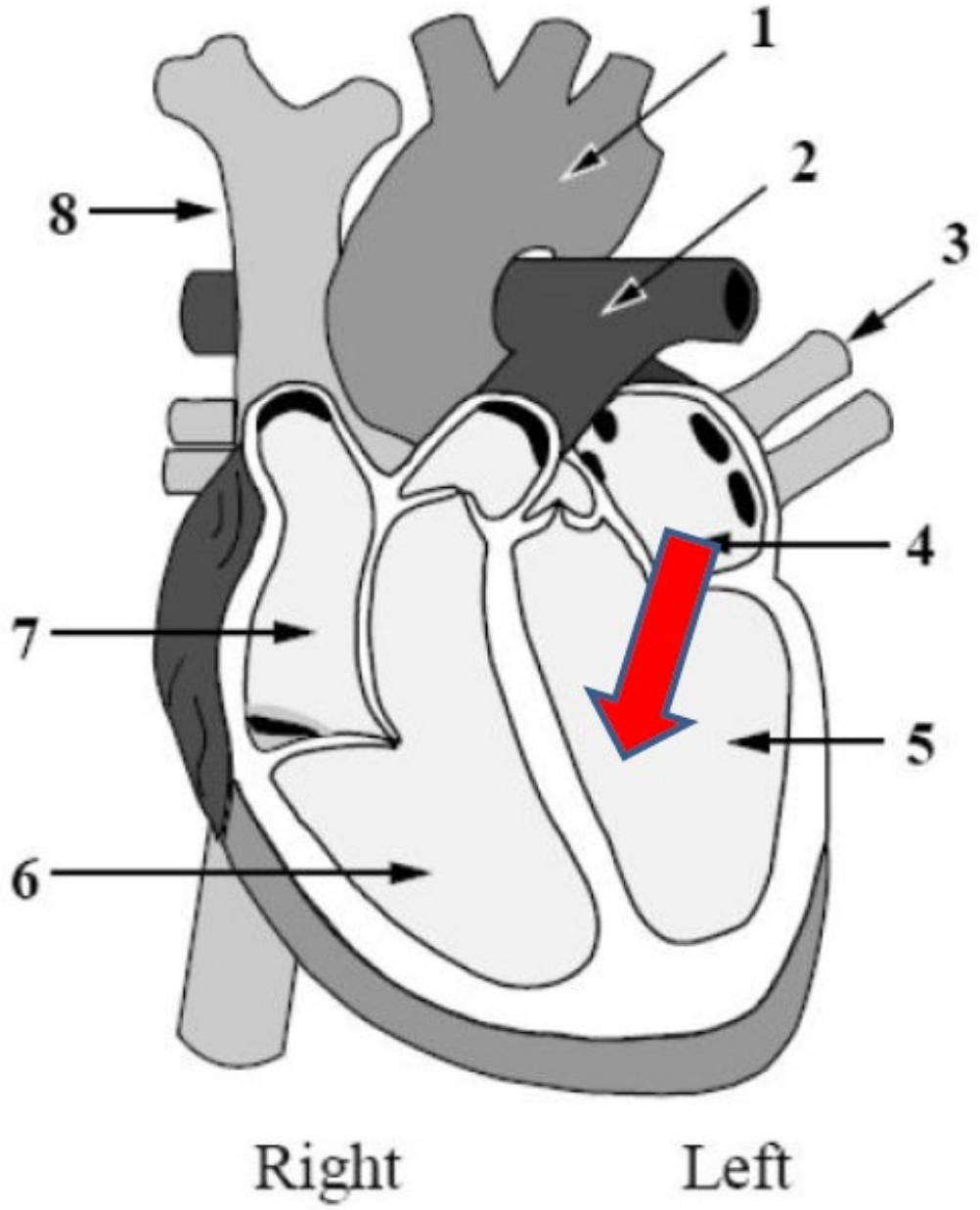
- Ventricle contacts and blood flows to pulmonary arteries (#2)
  - Valves close
- Blood flows to lungs to release CO_2 & pick up O_2



- O_2 *rich* blood flows from the lungs through the pulmonary veins (#3) to left atrium (#4)



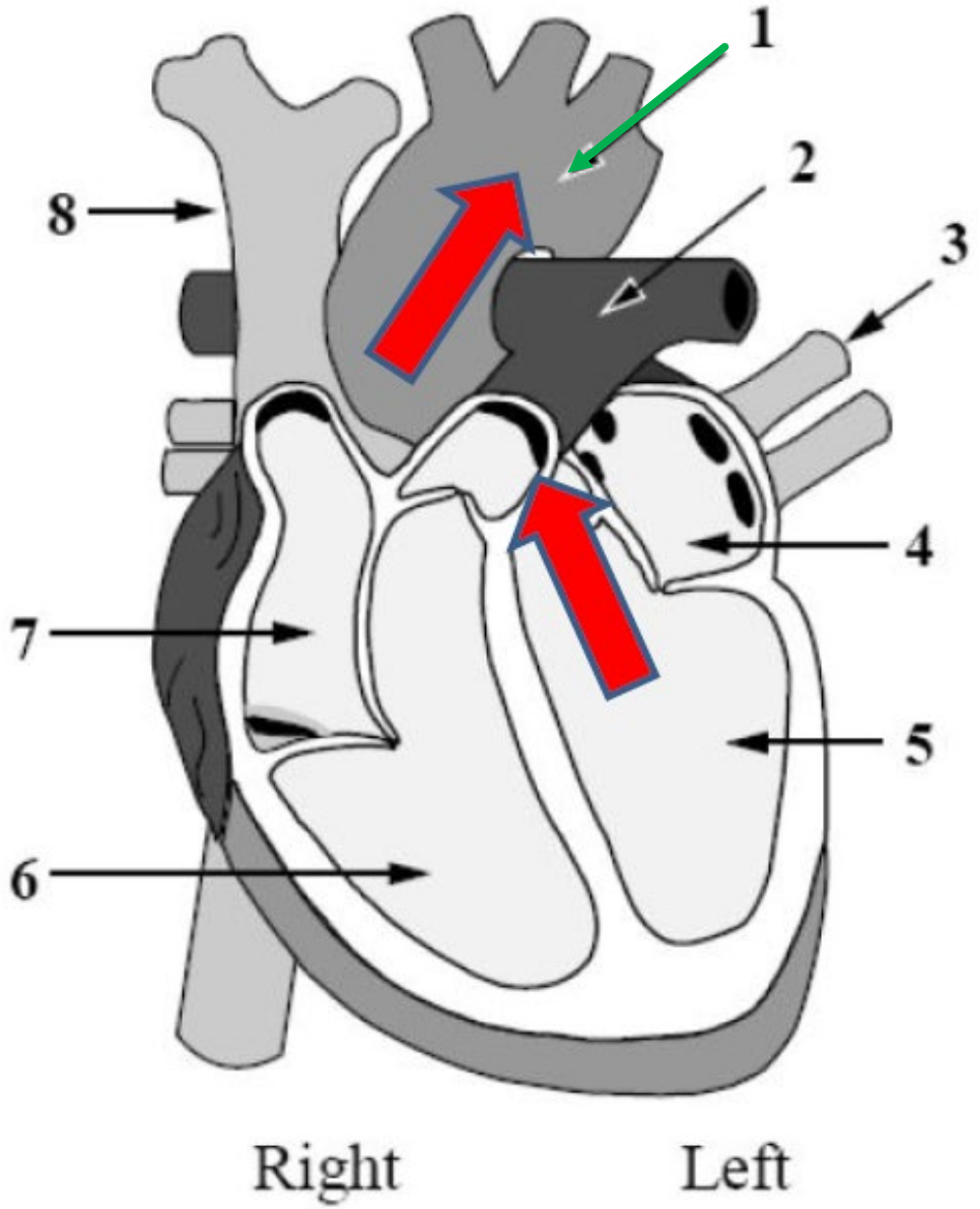
- Blood flows through the left atrium to the left ventricle (#5) when left atrium contracts



- The left ventricle contracts and blood flows to all parts of the body through the aorta (#1)

- Aorta is the largest artery in the body

- The sac that encloses the heart = pericardium. Fluid inside is called the pericardial fluid



Label the heart in your notes and describe the blood flow

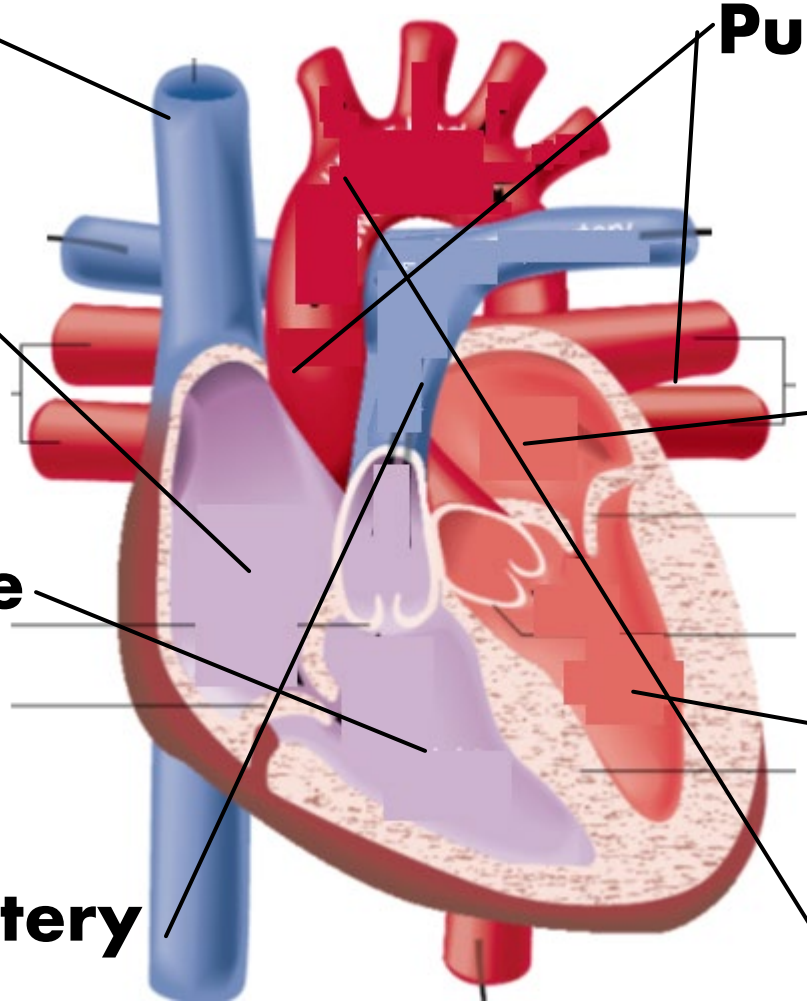
Blood Flow Through the Heart

Vena cava
Collects oxygen poor/carbon dioxide rich blood

Right Atrium
Contraction of right atrium forces blood into...

Right Ventricle
Right ventricle contracts and forces blood to the...

Pulmonary Artery
This moves blood to the lungs

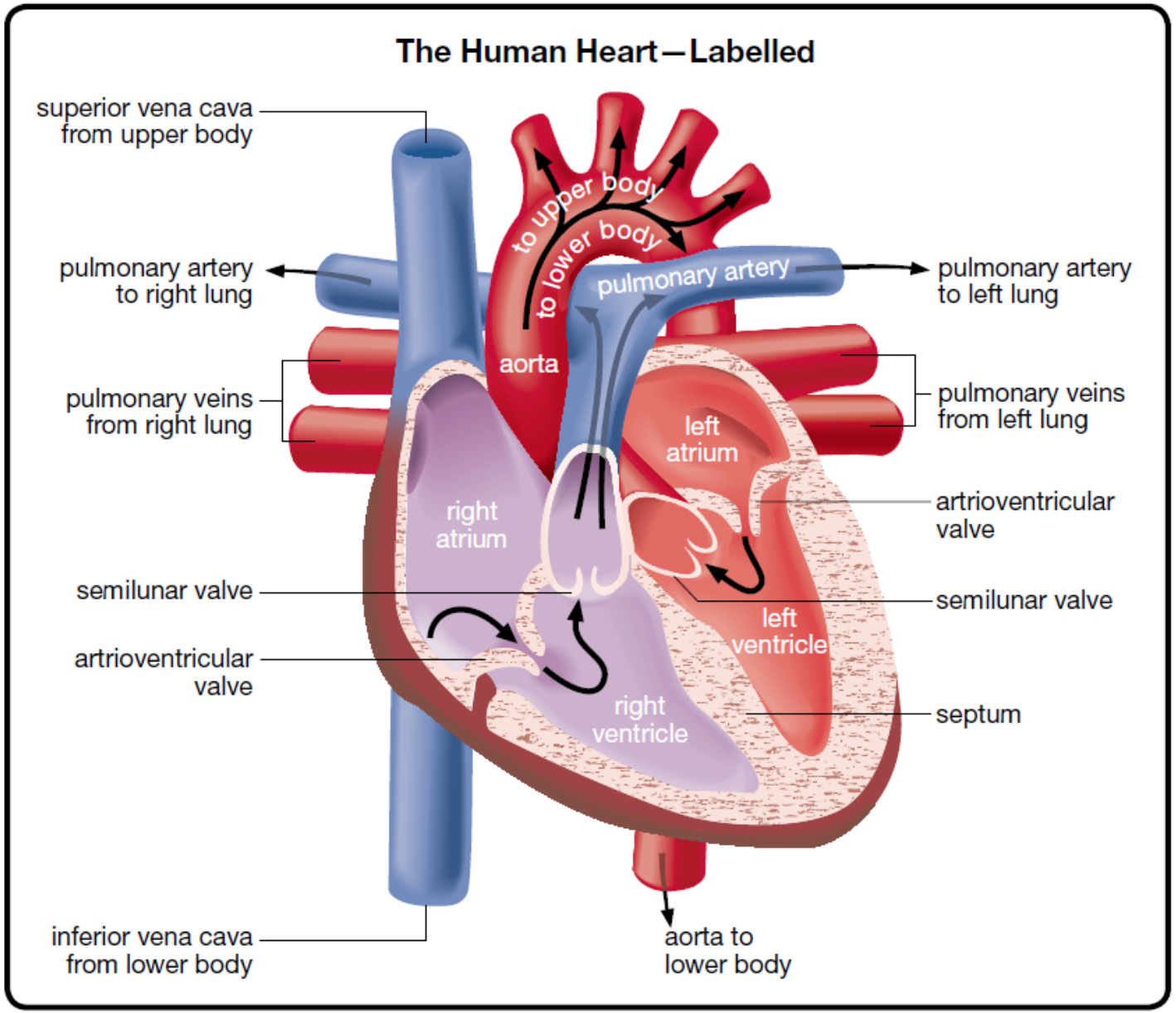


Pulmonary Veins
Move oxygen rich blood back into the heart in the...

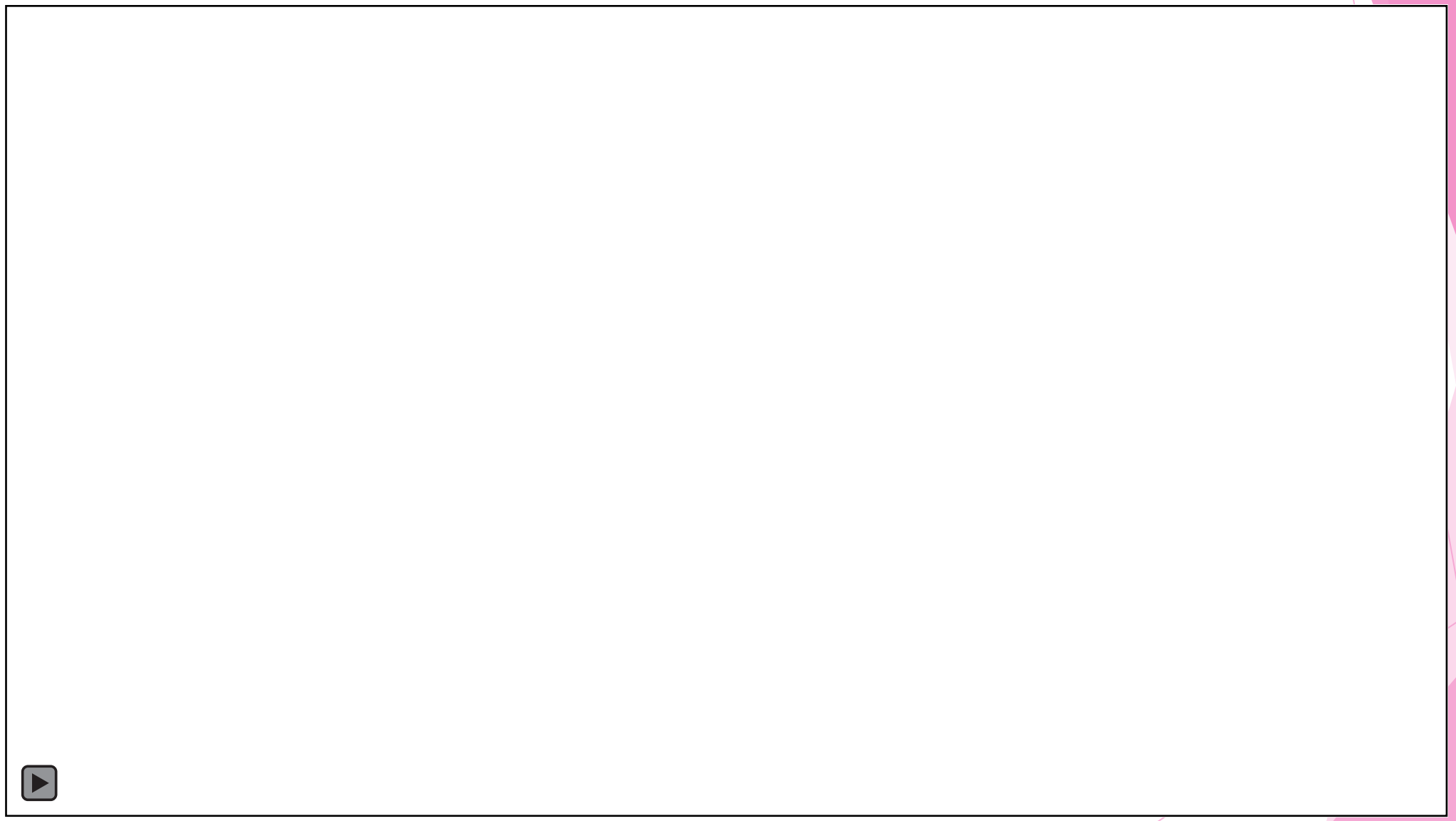
Left Atrium
The contraction of the left atrium forces blood into the...

Left Ventricle
The contraction of the left ventricle then forces blood to the...

Aorta


The Human Heart—Labelled
superior vena cava from upper body
pulmonary artery to right lung
pulmonary veins from right lung
semilunar valve
artrioventricular valve
inferior vena cava from lower body
to upper body
to lower body
aorta
pulmonary artery
pulmonary artery to left lung
pulmonary veins from left lung
left atrium
artrioventricular valve
semilunar valve
left ventricle
septum
right atrium
right ventricle
aorta to lower body

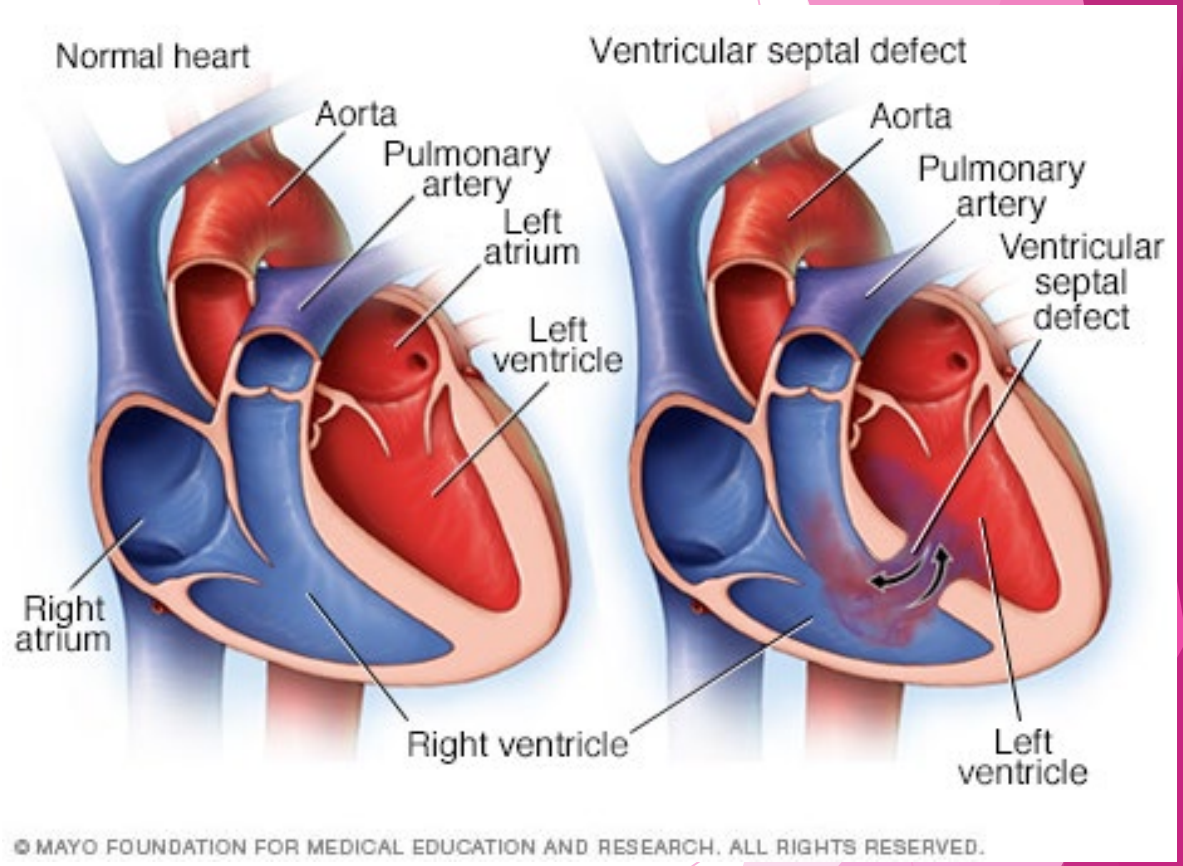
Heart Video (4 minutes)



Heart defects:

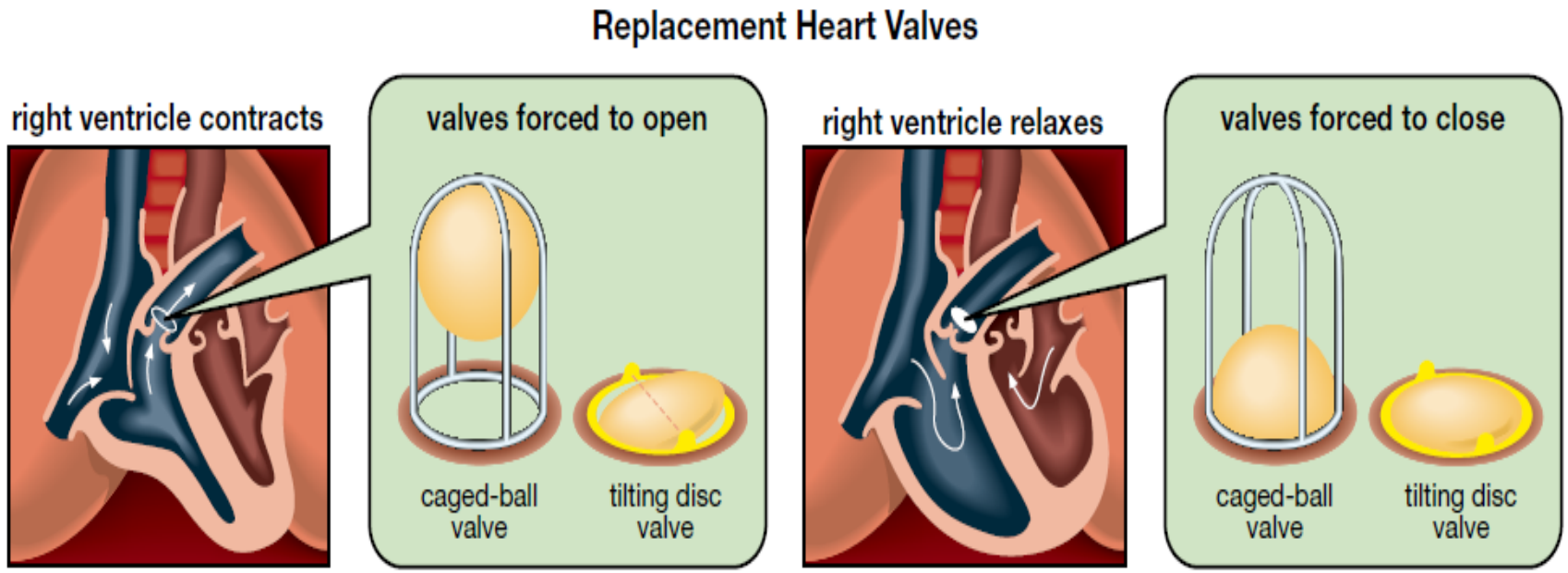
Septal defects:

- **Septal Defect**: condition where the opening between left and right halves of heart fails to close before birth and causes excess blood to be pumped to lungs
  - Normally referred to as a "hole in the heart"

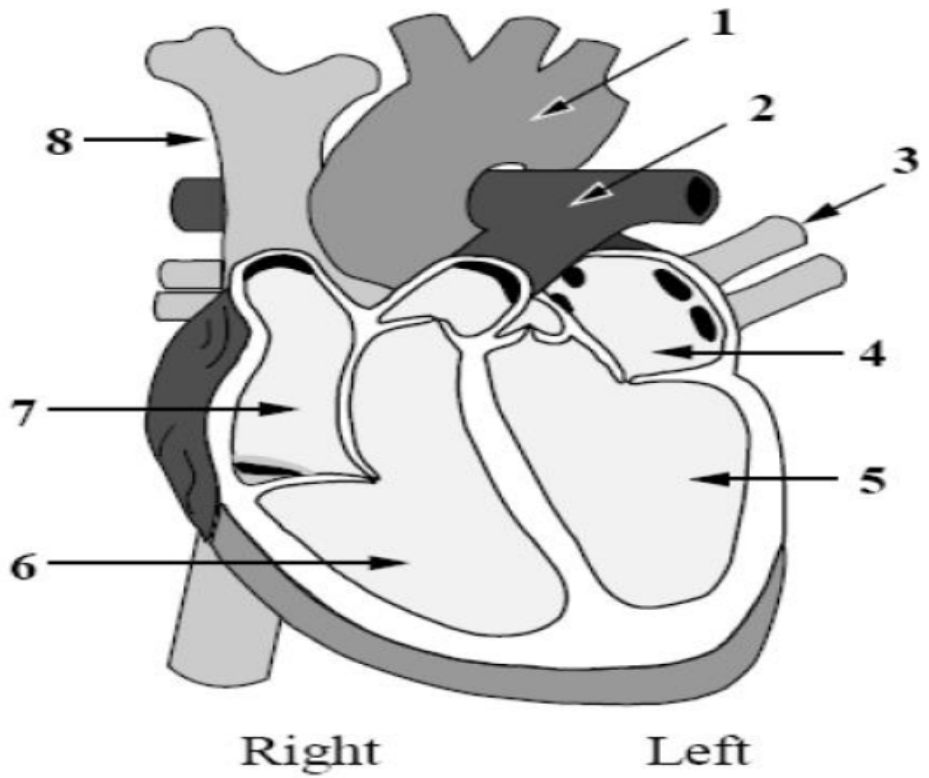


Artificial Heart Valves

- If your heart murmur is bad enough, your valves may have to be replaced



Label the heart, indicating path of blood flow.



Assignment:

- 1.1 assignment the heart
- Textbook:P. 19 Q #2, 4