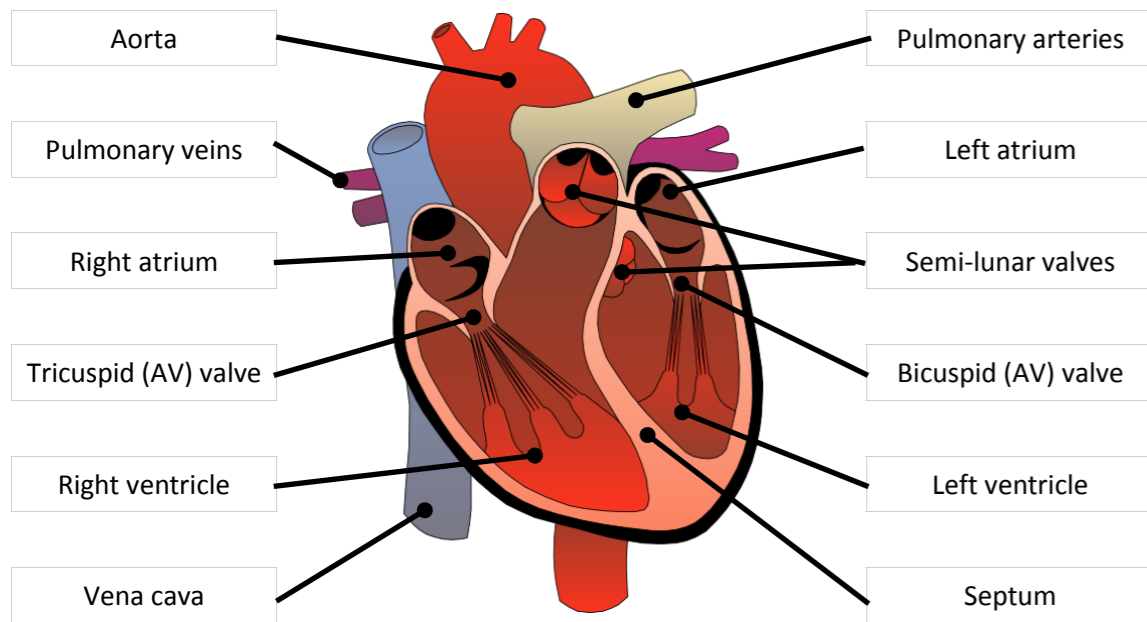


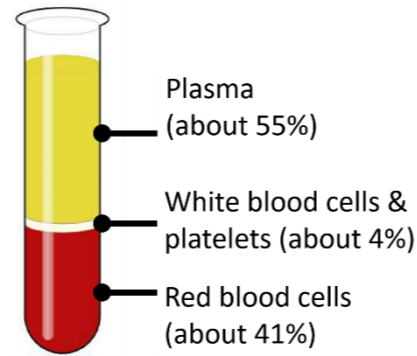
# KNOWLEDGE ORGANISER

# Unit 1 Anatomy & Physiology: The Cardiovascular System

## STRUCTURE OF THE HEART



## COMPOSITION OF BLOOD



## FUNCTIONS OF THE CARDIOVASCULAR SYSTEM

1. Delivery of oxygen and nutrients
2. Removal of waste products
3. Thermoregulation
4. Fight infection
5. Clot blood

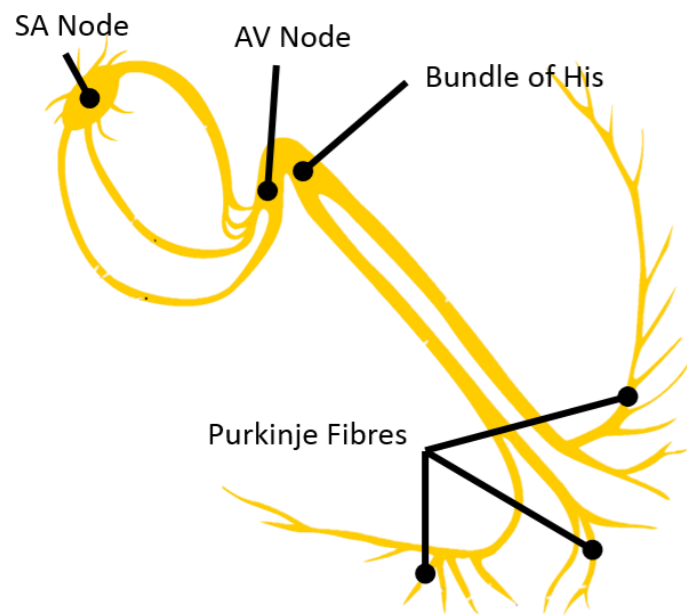
## STRUCTURE OF BLOOD VESSELS

ARTERY (& arteriole)	CAPILLARY	VEIN (& venule)
<ol style="list-style-type: none"> <li>1. Away from the heart</li> <li>2. Oxygenated blood*</li> <li>3. Thick walls</li> <li>4. High pressure</li> </ol>	<ol style="list-style-type: none"> <li>1. In the tissue</li> <li>2. Gaseous exchange</li> <li>3. Very thin walls</li> <li>4. High pressure</li> </ol>	<ol style="list-style-type: none"> <li>1. Back to the heart</li> <li>2. Deoxygenated blood*</li> <li>3. Thin walls</li> <li>4. Lower pressure</li> <li>5. Valves</li> </ol>

\*except for pulmonary artery/pulmonary vein where this is reversed

## NERVOUS CONTROL OF THE CARDIAC CYCLE

### Electrical Impulse Pathway



1. Sinoatrial Node	2. Atrioventricular Node	3. Bundle of His	4. Purkinje Fibres
Right atrium near vena cava	Septum near atria	Septum	Ventricle walls
Triggers atrial systole	Delays, then conducts through to ventricles	Conducts to base of ventricles	Conducts up ventricle walls

**1. Atrial Systole**

- Both atria contract
- Blood is pushed into ventricles through AV valves

**4. Iso-volumetric Relaxation**

- Semi-lunar valves close ('Dub')
- Filling occurs passively as blood returns to heart

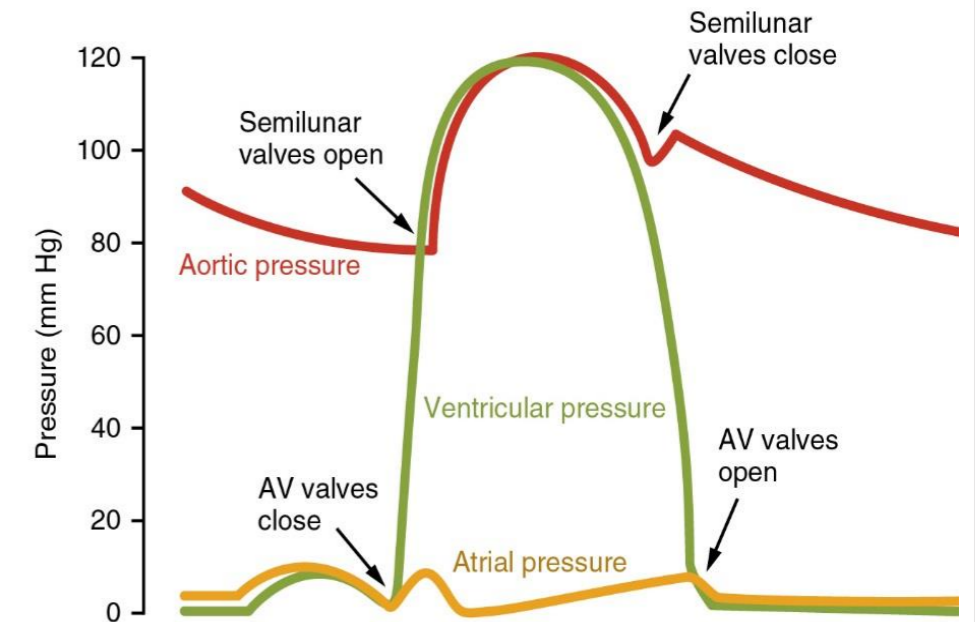
**2. Iso-volumetric Contraction**

- Pressure pushes AV valves closed ('Lub')
- Pressure forces Semi-lunar valves open

**3. Ventricular Ejection**

- Both ventricles contract
- Blood is ejected into Aorta / Pulmonary artery

### The Cardiac Cycle



### Influence of the Autonomic Nervous System on the Cardiac Cycle

SYMPATHETIC NERVOUS SYSTEM	PARASYMPATHETIC NERVOUS SYSTEM
<b>EXCITES</b>	<b>CALMS</b>
<ol style="list-style-type: none"> <li>1. Secretes adrenaline &amp; noradrenaline</li> <li>2. Increases Heart Rate</li> <li>3. Increases Blood Pressure</li> <li>4. Increases contractile force of cardiac muscle</li> <li>5. Stimulates vasoconstriction/vasodilation.</li> </ol>	<ol style="list-style-type: none"> <li>1. Decreases Heart Rate</li> <li>2. Decreases Blood Pressure</li> <li>3. Decreases Cardiac Output (Q)</li> </ol>

## RESPONSES TO EXERCISE (Short Term)

1. Anticipatory increase in heart rate prior to exercise
2. Increased heart rate
3. Increased cardiac output
4. Increased blood pressure
5. Redirection of blood flow

## ADAPTATIONS TO EXERCISE (Long Term)

1. Cardiac hypertrophy
2. Increase in resting and exercising stroke volume
3. Decrease in resting heart rate
4. Capillarisation of skeletal muscle and alveoli
5. Reduction in resting blood pressure
6. Decreased heart rate recovery time
7. Increase in blood volume

## ADDITIONAL FACTORS

1. Sudden arrhythmic death syndrome (SADS)
2. High blood pressure / low blood pressure
3. Hyperthermia / hypothermia