



# Knowledge Organiser- Unit 1- Body Systems- Cardio Vascular System

## Heart as a Double Pump:

Left side pumps oxygenated blood to the body (cells and working muscles)  
 Right side pumps deoxygenated blood to the lungs.

### Vascular Shunt, arterioles and pre-capillary sphincters-

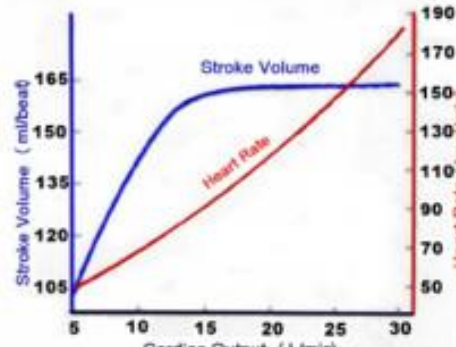
During rest, approx. 50% of blood goes to the organs and active tissues and 15% to skeletal muscles.

During exercise blood is redirected to the areas where it is needed. 25X more blood is sent to active muscles.

**Arterioles** are the main regulators of blood flow.

**Precapillary sphincter** is a band of smooth muscle that adjusts the blood flow into the capillaries.

	Average 18 year old	32 year old (Mo Farah)
Resting HR	70	33
Stroke Volume	70	152
Max Cardiac output	14.1	28.5



Approximate stroke volume and heart rate at different levels of cardiac output in a marathon athlete.

### Terms:

- Heart rate - beats per minute
- Stroke volume – blood pumped out per beat
- Cardiac output = stroke volume x heart rate – amount of blood pumped out per minute
- Maximum heart rate – 220 – age
- Resting heart rate – lowest possible heart rate when you are inactive
- Recovery rate – time taken for heart rate to get back to normal

### Key Words-

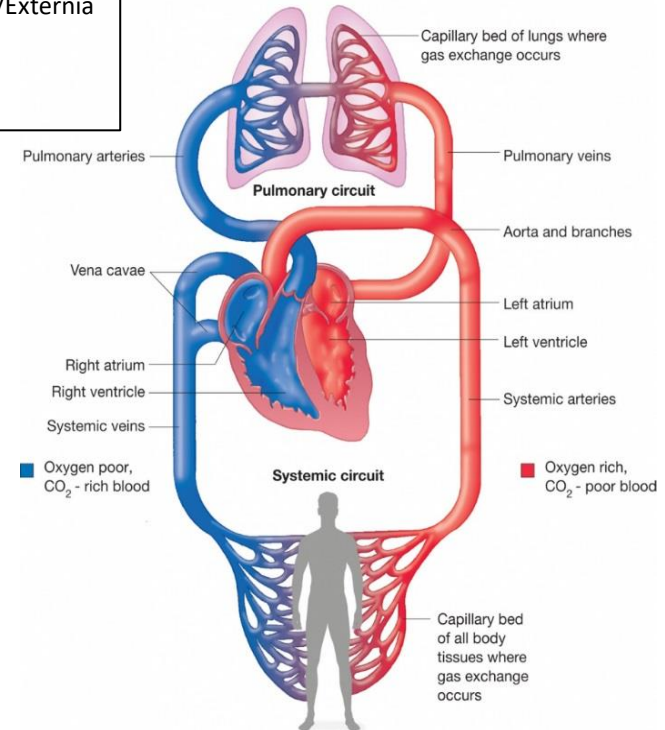
- Oxygen
- Carbon Dioxide
- Oxyhaemoglobin
- White blood cells
- Platelets
- Plasma
- Arteries
- Capillaries
- Venules
- Veins
- Tunica
- Adventia/Externa
- Media
- Intima
- Lumen

**Vein Placement-** to keep the blood moving, veins are located within muscles or between muscles and bones.

**Respiratory pump-** the simple action of breathing improves the flow of blood to the heart.

## The Effects of exercise on the Cardiovascular System

Long Term	Short Term
Increased stroke volume and increased cardiac output- cardiac output helps maintain blood pressure at the levels needed to supply oxygen blood for your brain and other vital organs.	Lactic acid effects your cardiovascular system as when it kicks in, the athlete feels worn out to the max, and feels the urgent need to stop, e.g. legs go dead and ache.
Decreased resting heart rate- your heart rate is lower when relaxing, this helps keep the body calm, and more fit when it comes to participating in sport as the heart can pump more blood round the body, in a calmer manner.	Redirection of blood flow- this is where during exercise the body craves more blood and minerals then normal, the blood is redirected to the most craving parts/muscles of the body from storage compartments around the body.
Cardiac hypertrophy- this is where cell size increases, therefore increasing the size of the organ allowing more oxygen and needed nutrients to be breathed in.	Heart rate at onset of exercise- this is how the heart rate changes during exercise,



$$CO = SV \times HR$$