Your notes

GCSE PE: revision notes

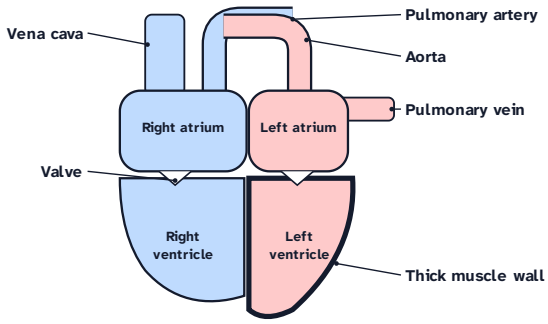
The cardiovascular system

Contents

1. Structure of the heart
2. The double circulatory system
3. Blood vessels and blood
4. Cardiac values
5. Key terms
6. Quick questions
7. What to do next

Structure of the heart

- The heart is a muscular pump with four chambers: the right and left atria at the top and the right and left **ventricles** below.
- The **septum** divides the left side from the right side, so oxygenated and deoxygenated blood don't mix.
- Valves (tricuspid, bicuspid and semilunar) stop blood flowing backwards.
- Blood vessels: the vena cava brings deoxygenated blood to the right **atrium**; the pulmonary artery takes it to the lungs; the pulmonary vein brings oxygenated blood back to the left **atrium**; the **aorta** carries it to the body.



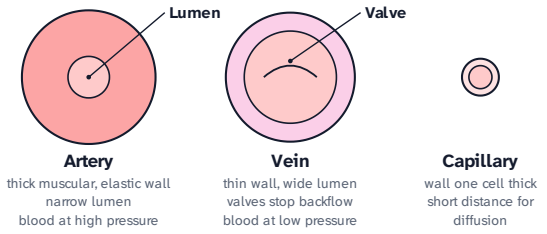
Seen from the front: the right side of the heart is on the left of the picture.

The double circulatory system

- Pulmonary circulation: the right side of the heart pumps deoxygenated blood to the lungs to collect oxygen.
- Systemic circulation: the left side pumps oxygenated blood around the body. Its wall is thicker because it pumps further.
- Blood passes through the heart twice on each circuit of the body.

Blood vessels and blood

- Arteries carry blood away from the heart at high pressure. They have thick, muscular, elastic walls.
- Veins carry blood back to the heart at low pressure. They have thinner walls and valves to stop backflow.
- Capillaries are one cell thick, so oxygen, carbon dioxide and nutrients can diffuse through them to the muscles.
- Red blood cells carry oxygen using **haemoglobin**. White blood cells fight infection. Platelets help clotting. Plasma carries everything.
- **Vascular shunting**: during exercise, blood vessels to the working muscles widen (vasodilation) and those to organs like the stomach narrow (vasoconstriction), so more blood goes where it's needed.



Cardiac values

- Heart rate: the number of times the heart beats per minute (bpm).
- **Stroke volume**: the volume of blood pumped out of the left **ventricle** in one beat.
- **Cardiac output**: the volume of blood pumped out of the heart per minute. **Cardiac output** = **stroke volume** × heart rate.
- Example: a **stroke volume** of 70 ml and a heart rate of 70 bpm give a **cardiac output** of 4,900 ml (4.9 litres) a minute.

Key terms

Atrium	An upper chamber of the heart that receives blood.
Ventricle	A lower chamber of the heart that pumps blood out.
Septum	The wall dividing the left and right sides of the heart.
Aorta	The artery carrying oxygenated blood from the heart to the body.
Stroke volume	The volume of blood pumped from the left ventricle in one beat.
Cardiac output	The volume of blood pumped by the heart per minute.
Vascular shunting	Redirecting blood to working muscles by widening and narrowing vessels.

Your notes

Haemoglobin	The protein in red blood cells that carries oxygen.

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. Which chamber of the heart pumps oxygenated blood to the body?
2. Which blood vessel carries deoxygenated blood from the heart to the lungs?
3. Which blood vessel brings deoxygenated blood from the body into the heart?
4. What is the formula for cardiac output?
5. A performer has a stroke volume of 80 ml and a heart rate of 60 bpm. What is their cardiac output?
6. Which blood vessels have valves to stop blood flowing backwards?
7. Which blood vessels are one cell thick?
8. What do red blood cells carry?

Answers

1. Left ventricle
2. Pulmonary artery
3. Vena cava
4. Stroke volume multiplied by heart rate
5. 4,800 ml per minute
6. Veins
7. Capillaries
8. Oxygen

What to do next

Practise 12 questions on this topic

Try 5 exam questions, with mark schemes

Read the lesson, one step at a time

Free revision for GCSE and KS3 at lycolearn.co.uk. Some notes are for one exam board only, and say so in brackets.

Your notes