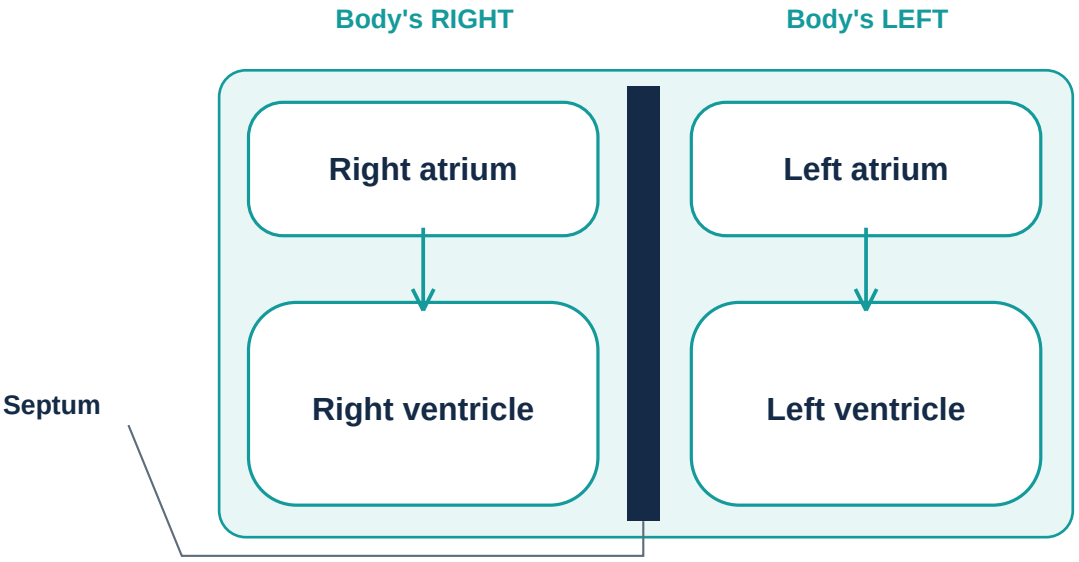
Four chambers, two pumps

The mammalian heart lies in the chest between the lungs. The right and left sides work together: the right pumps to the lungs; the left pumps to the rest of the body.

1. INTERNAL PLAN: READ LEFT AND RIGHT CORRECTLY



Orientation and connections only; chamber shapes, vessel openings and valves are simplified or omitted. Arrows show atrium-to-ventricle flow.

2. ATRIA RECEIVE; VENTRICLES EJECT

Atria are the upper receiving chambers. Each atrium passes blood into the ventricle on the same side. Ventricles are the lower pumping chambers that eject blood into arteries. In a front-view diagram, the person's right is on the reader's left.

3. SEPARATION AND MUSCLE

The septum divides the two sides, preventing oxygenated and deoxygenated blood from mixing in a normal adult heart. The walls contain cardiac muscle (myocardium). Ventricular walls are thicker than atrial walls; the left ventricular wall is thickest. Pressure and wall thickness are explored in Lesson 8.3.2.

Chambers, septum and muscle: NHLBI, What the Heart Looks Like.
Anatomical orientation and wall structure: OpenStax Anatomy & Physiology 2e, 19.1.

Scope: Cambridge Biology 9700 syllabus, section 8.3, outcome 1, p. 28.

Connect the vessels to chambers

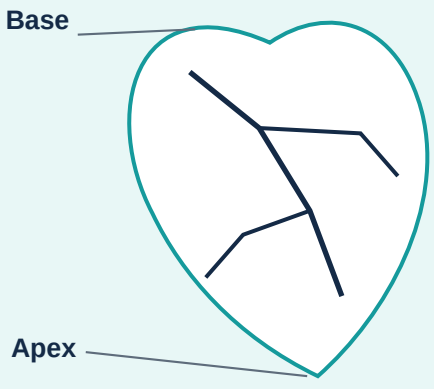
Name arteries and veins by the direction blood travels relative to the heart, not by oxygen content. Arteries carry blood away; veins carry it towards the heart.

1. THE FOUR MAIN VESSEL GROUPS

Venae cavae Body → right atrium	Deoxygenated
Pulmonary arteries Right ventricle → lungs	Deoxygenated
Pulmonary veins Lungs → left atrium	Oxygenated
Aorta Left ventricle → body	Oxygenated

The pulmonary trunk leaves the right ventricle and divides into pulmonary arteries. Superior and inferior venae cavae return blood from the upper and lower body.

2. RECOGNISE THE OUTSIDE



The broad base is where major vessels attach. The apex is the pointed lower tip, directed towards the person's left.

Coronary vessels run over the surface. Coronary arteries supply the heart muscle with oxygen and nutrients; they branch from the aorta.

Surface landmarks only; branching is schematic. Major vessels are listed above, not drawn here.

Blood routes and coronary supply: NHLBI, How Blood Flows through the Heart.
Base, apex and coronary vessels: OpenStax Anatomy & Physiology 2e, section 19.1.

Scope: Cambridge Biology 9700 syllabus, section 8.3, outcome 1, p. 28.

Valves keep blood moving one way

Valves open and close passively as pressure differences change. They prevent reverse flow; they do not pump blood or actively pull themselves open.

1. MATCH EACH VALVE TO ITS POSITION

Tricuspid (right AV)

Right atrium → right ventricle

Bicuspid / mitral (left AV)

Left atrium → left ventricle

Pulmonary semilunar

Right ventricle → pulmonary trunk

Aortic semilunar

Left ventricle → aorta

Arrows show permitted forward flow. AV = atrioventricular. Semilunar valves are at the exits of the ventricles into the great arteries.

2. VALVE SUPPORT AND BACKFLOW

AV valves stop blood returning to the atria when ventricular pressure rises. Tendinous cords (chordae tendineae), attached to papillary muscles, prevent these valve flaps turning inside out. Semilunar valves prevent blood returning from the arteries to the ventricles; they have no tendinous cords.

3. TRACE A COMPLETE CIRCUIT

Body → venae cavae → right atrium → right ventricle

→ pulmonary arteries → lungs → pulmonary veins

→ left atrium → left ventricle → aorta → body

The right side carries relatively deoxygenated blood, not oxygen-free blood. Pulmonary arteries carry it to the lungs; pulmonary veins bring oxygenated blood back.

Forward flow, valves and complete circuit: NHLBI, How Blood Flows through the Heart.
Valve names, chordae and papillary muscles: OpenStax Anatomy & Physiology 2e, 19.1.

Scope: Cambridge Biology 9700 syllabus, section 8.3, outcome 1, p. 28.