

Teaching Tips for teachers / parents

Hearts & circulation



The basics

De-oxygenated blood comes from the body into the right side of the heart.

This pumps it to the lungs to get rid of the CO₂ and pick up O₂.

Oxygenated blood goes into the left side of the heart.

Then is pumped to one part of the body.

Heart → lungs → heart → body → etc

In more detail

Steps	Teaching Tips – memory aids & avoiding misconceptions
De-oxygenated blood comes from the body to the heart via the vena cava	See 'Blue Blood' heading below! (Vena cava is actually 2 – superior & inferior) It's a vein – veins go TO the heart.
Enters the right atrium	Right & Left are according to the side of the heart as it sits inside the body, not as you're looking at it. This needs explaining very explicitly to primary age. Atria are Above the ventricles – A&A
Pumped down through the tricuspid valve...	tRicuspid is on the Right – RI&RI If dissecting, the 3 flaps should be visible
... into the right ventricle	Ventricles are the V shaped ones
Pumped out through the pulmonary artery, past the semi-lunar valves	Pulmonary means lungs Arteries go Away from the heart – A&A Semi-lunar = half moon: exactly what they look like
In the lungs, blood passes through the tiny capillaries, CO ₂ diffuses out to the air, O ₂ diffuses into the blood & binds with haemoglobin in red blood cells	Be clear that air is a mix of gases – we don't breathe in pure O ₂ & breathe out pure CO ₂ !
Now oxygenated, blood flows back to heart through pulmonary vein	Pulmonary = lungs. Veins go TO the heart
Enters left atrium	Atrium Above, Left side of heart in body
Pumped down through the bicuspid value ...	This valve has 2 flaps. Also known as the mitral valve in some diagrams – supposedly looks like a bishop's mitre

... into the left ventricle	V for Ventricles
Pumped out through the aorta	Biggest artery (A for Artery, A for Away from the heart), which quickly branches to send blood to different parts of the body. Oxygenated blood goes to only one part of the body before returning to the heart – it doesn't go all around everywhere. Eg – to kidneys to have waste filtered out Eg – to intestines to collect nutrients Eg – to any muscle
Capillaries in all body parts – CO2 dissolves into plasma. O2 released from haemoglobin.	Plus waste products collected & nutrients delivered
De-oxygenated blood passes through veins...	Repeat 'blue' blood reminder.
If you are dissecting...	Look really closely at how thick and thin each part of the heart is. Ask the pupils to think about WHY each bit is the thickness it is. Atria – Very stretchy. Strong thick bundles of muscle with tissue-thin layer between. This allows it to stretch as it fills with blood from the veins. Ventricles – much thicker. Left is waaaaay thicker than right, because right has to pump only to lungs, while left has to pump around the entire body. Valves – v v thin & flexible to open and close as blood flows past. Well worth cutting along the pulmonary artery to show the semi-lunar valve. 'Heart strings' are real. They're the fine but strong tendons that hold the flaps of the bicuspid & tricuspid valves to stop them flipping the wrong way.

Blue Blood

De-oxygenated blood is not blue! It is shown this way on books, models & diagrams just for clarity.

It is slightly darker red than oxygenated. Lovely explanation here of why our veins look blue through our skin:

https://educationendowmentfoundation.org.uk/public/files/Publications/Science/What_colour_is_deoxygenated_blood.pdf

From same science designer: some animals have blue, green or even purple blood (NB adult to check the content first, esp the bit about purple blood which Y6 will find it hilarious ;-)
<https://www.compoundchem.com/2014/10/28/coloursofblood/>

A note about diagrams

The heart is complicated. It's 3d. Bits are in front of other bits. Some labeling worksheets try to help by simplifying it but this can create misconceptions for the future. I therefore strongly advise that you do not use diagrams simplified to have the aorta & pulmonary arteries running parallel vertically. It's not correct: the pulmonary artery crosses in front of the aorta.

