

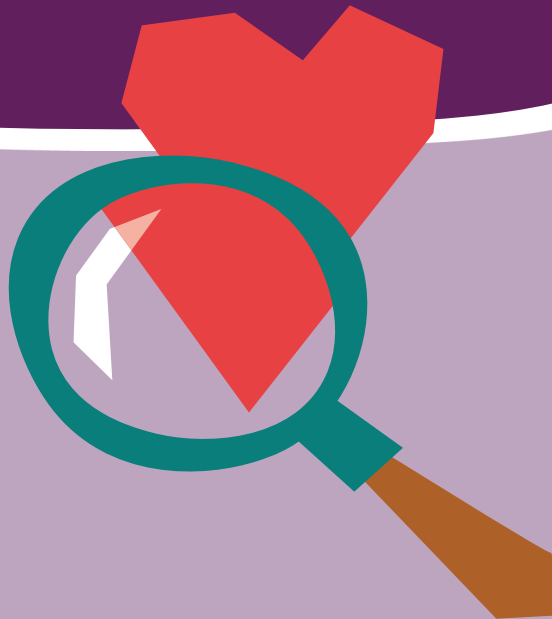


Winchester
Science Centre

By Wonderseekers

The Science of Me

Pre-visit resources
for KS2



The Science of Me KS2 Pre-visit Activities

These activities are designed to be completed before you visit for your workshop. We recommend working through the activities from 1 to 3 but you are welcome to pick and choose depending on your group's prior knowledge and any ideas they may spark along the way.

Through these activities you will start exploring the circulatory system, involving your key organs such as your heart and your lungs. You and your students will get to examine their own heartbeat, and explore how blood moves around the body to keep us healthy.

Teacher Guide

Learning Objective

- To be able to identify the four chambers of the heart.
- To be able to describe the sequence of blood flow through the heart, lungs and body.
- To be able to explain the roles and physical differences between arteries and veins.
- To be able to understand how one-way valves ensure blood flows in one direction.
- To be able to differentiate the difference between oxygen-rich blood and oxygen-poor blood.

Key Science

Our human bodies are made up of lots of different components. We have our skeleton that provides us structural support, our muscles which help us move and our organs which carry out specific functions in the body.

Two of the most important organs in the body are the heart and lungs. Our heart is responsible for pumping the blood around our body. Our blood carries all the important nutrients and chemicals our body needs to function. This is why the heart is so important, as moving the blood around keeps our bodies working.

One of the key elements it moves around our body is oxygen. Oxygen is key to powering the cells in our body, so it is really important our blood can get it to the rest of the body. To do this, we breathe in oxygen through our lungs which are connected to the heart in the circulatory system. This system starts with blood with no oxygen being pumped from the heart. through an artery up the lungs. Here the blood collects the oxygen before heading back to the heart through a vein. Then the blood is pumped by the heart through another artery to the rest of the body. Finally it returns through a vein. As blood travels through arteries it moves faster due to the force produced by the pumping heart. To support this the arteries are wider and have thicker walls to protect against this force.

Curriculum Links

- Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.
- Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.
- To understand how the circulatory system enables the body to function.

Key terms

- **Lungs** – Lungs are bag-like organs, or body parts, used for breathing.
- **Heart** – A heart is an organ in the centre of the chest that pumps continuously. This pumping moves blood around the body, which is vital for providing parts of the body with nutrients and oxygen.
- **Vein** – A vein is one type of blood vessel that has the job of carrying deoxygenated blood away from the body's tissues and back to the heart.
- **Artery** – An artery is a type of blood vessel (something that carries blood) which has the job of taking the blood full of oxygen away from the heart.
- **Healthy** – Beneficial for health.
- **Unhealthy** – Harmful to health.
- **Organ** – An organ is made up of tissues, all working together to carry out a job in the body. An organ is an internal part of the body that carries out a specific function.
- **Tissue** – A group of similar cells and their intercellular material that work together to perform a function.
- **Cell** – A cell is a single, tiny building block that makes up living things.
- **Organism** – An organism is a term for any living thing.
- **Circulatory System** – The circulatory system is an organ system in the body of most animals. In humans, the system involves the heart, blood vessels (arteries and veins) and blood.
- **Atrium** – Each of the two upper cavities of the heart from which blood is passed to the ventricles. The right atrium receives deoxygenated blood from the veins of the body, the left atrium oxygenated blood from the pulmonary vein.
- **Ventricle** – The two bottom chambers are the right ventricle and the left ventricle. These pump blood out of the heart.
- **Aorta** – The aorta is the largest artery of the body and carries blood from the heart to the circulatory system
- **Vena Cava** – Your inferior vena cava, your body's largest vein, carries oxygen-depleted blood back to your heart from the lower part of your body.
- **Oxygen** – A gas essential for living organisms. We need it to breathe.
- **Nutrition** – Nutrition is about how our bodies get what they need to function from food and drink. We get nutrients from what we eat and drink.

Activity 1 – Feel the Heartbeat (10 minutes)

Overview

This activity invites students to investigate their heart rate and understand how exercise affects the heart. They'll measure their pulse before and after movement to observe changes and learn why the heart reacts to physical exertion.

You will need (per group)

- Paper.
- Pencil.
- Timer.

Instructions

1. Begin by discussing what a resting heart rate is and why it's important.
2. Have students locate their radial pulse (inside of the wrist). Demonstrate the following:
 - Turn your palm upwards.
 - Using your index and middle fingers, place them gently on your thumb.
 - Slide your fingers down to the base of the thumb where it meets the wrist.
 - Gently press to feel for your pulse.
3. If students struggle:
 - Encourage small finger adjustments and varied pressure.
 - Ensure gentle contact—too much pressure can block the pulse.
 - Help them find the groove between wrist bone and tendons.
 - Use a marker (safe for skin) to mark the correct location.
 - Remind them not to use their thumbs, which have their own pulse.
4. Once the pulse is located, set a timer for 60 seconds and have students count their heartbeats. Record the number on paper.
5. Ask students to predict what will happen to their heart rate after exercise.
6. Set a timer for another 60 seconds and have students do star jumps or jog on the spot.
7. Immediately after, reset the timer for 60 seconds and have students measure their heart rate again.
8. Record the new count and compare both numbers.

Activity 2: 'Heart Pump' Interactive Demo (15 minutes)

Overview

In this hands-on demonstration, students explore how the heart pumps blood through its four chambers. Coloured water and balloons model oxygen-rich versus oxygen-poor blood flow, while balloons act as valves to prevent backflow.

You will need

- 4 × clear jars.
- Tap water.
- 2 × balloons (one red, one blue; spares are recommended).
- 4 × straws.
- Red and blue food colouring or washable paint.
- Scissors.
- Tape.

Activity Set-Up (Teacher prep before lesson)

- Fill two jars $\frac{3}{4}$ full with water. Add blue colouring to one jar, red to the other.
- Stretch each balloon and fit one over each jar's opening:
 - Red balloon over red water jar and its empty partner.
 - Blue balloon over blue water jar and its empty partner.
- If balloons won't fit, trim the tip off before stretching.
- Pinch and lift each balloon dome; snip a small opening to insert a straw.
- Place a straw through each balloon into the coloured water jars. Ensure it's fully immersed.
- Attach a second straw to each submerged straw (use tape or cut a slit for a snug fit).
- Route each extra-long straw into the matching empty jar.
- Prime the system by gently pressing balloons until water flows through the straws.

- Demonstrate pressing down on a balloon over a coloured water jar.
- Point out how this pushes water (blood) through the straw into the empty jar.
- Explain that each jar represents a heart chamber:
 - Blue water jar = right atrium
 - Empty jar linked to blue = right ventricle
 - Red water jar = left atrium
 - Empty jar linked to red = left ventricle
- Clarify that blue water is oxygen-poor blood, red is oxygen-rich blood.
- Show how balloons mimic heart valves, allowing forward flow and preventing backflow.

Take it further

Explore how valve malfunctions (e.g., leaking balloons) affect blood flow in this model

Activity 3: The Blood Vessel Game (15 minutes)

Overview

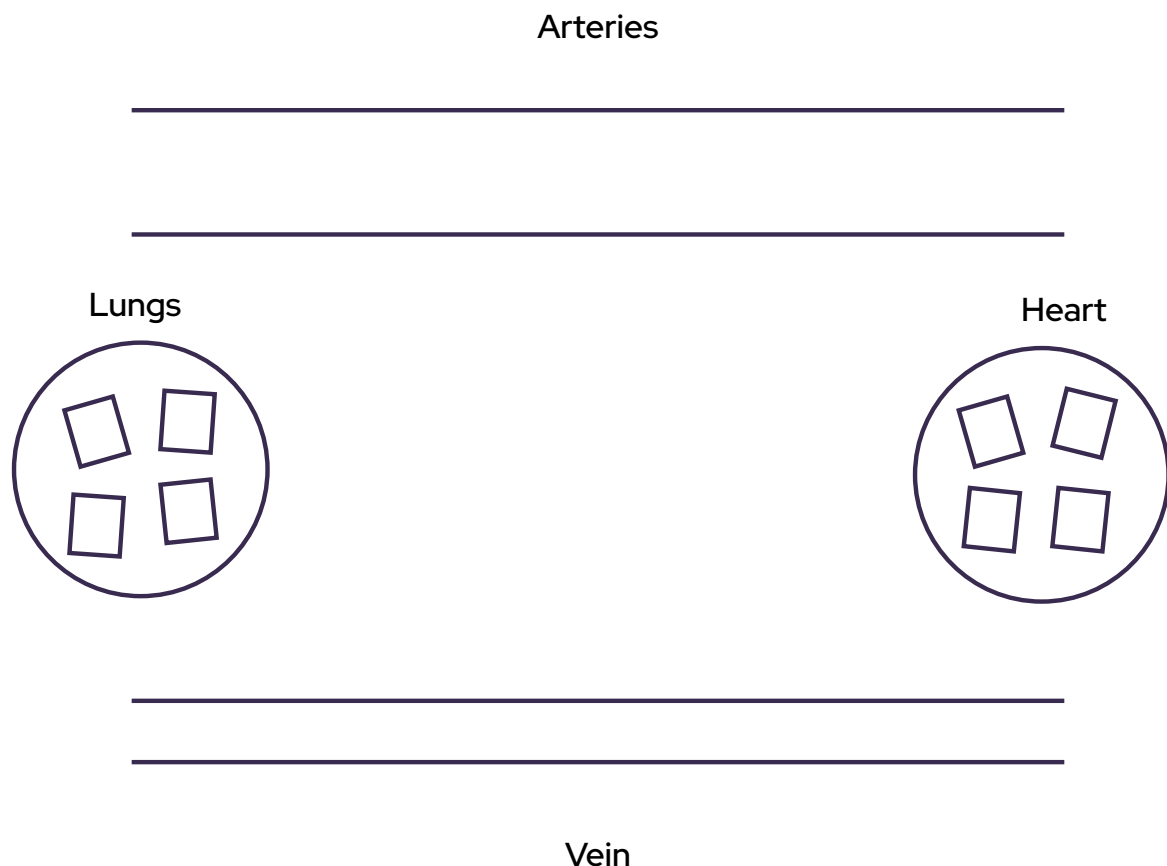
This game has students simulate how blood travels through arteries and veins, showing the differences in flow speed and direction. Two teams ("Heart" and "Lungs") compete to swap oxygen-poor and oxygen-rich "blood cells" between bases under timed conditions.

You will need

- Tape or cones (to mark two side-by-side lanes)
- Two colours of beanbags or balls (red = oxygen-rich; blue = oxygen-poor)
- 2 containers (buckets or hula-hoops) for home bases
- Timer

Activity Set-Up

- Use tape or cones to create two equal-length, parallel rectangular paths with about 2 feet between them.
- Ensure one path is noticeably wider (artery) and the other narrower (vein).
- Position a "home base" container at each end of the lanes.
- Place 4 beanbags in each home base: 2 red and 2 blue.



Instructions

1. Divide each group into two teams of equal size:
 - Team Heart (goal: deliver red beanbags to the heart base)
 - Team Lungs (goal: deliver red beanbags to the lungs base)
2. Explain vessel rules:
 - On the wider “artery” path, players must skip.
 - On the narrower “vein” path, players must walk toe-to-heel.
3. Game play:
 - When the timer starts, one player from each team grabs a blue beanbag and runs down the path on their right toward the opposing base.
 - Upon arrival, they exchange the blue for a red beanbag, then return via the other lane to their own base and deposit the red.
 - Only one player per team is active at any time; teammates tag in/out between turns.
 - Always keep the chosen path to your right.
4. Timing and scoring:
 - Agree on round length and start the timer.
 - When time’s up, any beanbag in hand returns to its source base.
 - Count red beanbags in each team’s base—the team with more red wins.
5. Additional movement rules:
 - No running on the artery—clearly skip.
 - No cheating on the vein—each step’s toes must touch the heel.
6. Bring the class back together to discuss what they noticed.