Unit Overview: Circulatory System

Audience	Students aged approximately 11–14 (Years 7–9 / Grades 6–8).
Length	Six lessons of approximately 50–60 minutes each.
Slides	35 slides, including title and unit review.
Core idea	The circulatory system is a transport system that works with other body systems to supply cells and remove wastes.
Teaching pattern	Hook → Observe → Predict → Explain → Apply → Check.
Practical	Lesson 5 includes a pulse-rate investigation with graphing and interpretation.
Assessment	Ongoing retrieval questions plus a final systems-thinking review on Slides 34–35.

Teaching approach

- Keep the slides image-led. Ask students to interpret the visual before giving the explanation.
- Use short paired discussion, mini-whiteboards, quick sketches and oral sequencing rather than prolonged copying.
- Return repeatedly to the central question: how does the body move useful substances to cells and remove waste substances from them?
- Where a diagram uses red and blue pathways, emphasise that human blood is always red. The blue pathway is a diagrammatic convention for oxygen-poor blood, not blue blood inside the body.
- Use the same scientific vocabulary consistently: heart, chamber, valve, artery, vein, capillary, plasma, red blood cell, white blood cell, platelet, pulse, oxygen, nutrient, waste, diffusion.

Suggested unit outcomes

- Describe the main function of the circulatory system.
- Identify the four chambers of the heart and trace the path of blood through the heart, lungs and body.
- Compare arteries, veins and capillaries and link their structure to their function.
- Describe the main components of blood and their functions.
- Measure pulse rate, collect data and explain why heart rate changes during and after exercise.
- Explain how the circulatory, respiratory and digestive systems work together to supply body cells.

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Lesson 3 — Blood Vessels: Built for Different Jobs

Slides	13–17
Suggested time	50–55 minutes
Big question	How does the structure of a blood vessel help it do its job?
Resources	Slide deck; comparison table or exercise book.
Outcome	Students compare arteries, veins and capillaries and link visible structural features to function.

Learning objectives

- Identify arteries, veins and capillaries from their structure.
- State the direction of blood flow in arteries and veins.
- Explain how wall thickness, lumen size and valves relate to function.
- Explain why capillaries are effective exchange surfaces.

Key vocabulary

- artery; vein; capillary; lumen; wall; valve; pressure; exchange

Slide 13 — Three Types of Blood Vessel

Purpose: Begin with observation and comparison before definitions.

Ask: What differences can you see among the three vessels? Which one has the thickest wall? Which has a valve? Which is narrow enough for red blood cells to pass almost one at a time?

Do: Students write three observations only — no explanations yet.

Slide 14 — Arteries

Purpose: Link thick, elastic/muscular walls to high-pressure blood leaving the heart.

Explain: Arteries carry blood away from the heart. Their walls are thick, muscular and elastic so they can withstand and smooth the high pressure produced by heart contractions. Their lumen is relatively narrow compared with a vein of similar external diameter.

Ask: Why would a thin-walled vessel be unsuitable immediately downstream from the heart?

Slide 15 — Veins

Purpose: Show how veins are adapted for lower-pressure return flow.

Explain: Veins carry blood toward the heart. Pressure is lower, so walls are thinner and the lumen is larger. Many veins, especially in the limbs, contain valves that reduce backflow.

Ask: Why are valves especially useful in veins returning blood from the legs?

Extension: Muscle contractions around veins can help push blood toward the heart; valves help keep that movement one-way.

Slide 16 — Capillaries

Purpose: Show the site of exchange between blood and body cells.

Explain: Capillaries form dense networks through tissues. Their walls are only about one cell thick, creating a very short diffusion distance. Their narrow diameter slows and directs blood close to cells.

Ask: Which substances are moving from blood to cells? Which are moving from cells to blood?

Apply: Students explain why a thick-walled capillary would be less effective at exchange.

Slide 17 — Compare the Three

Purpose: Consolidate structure–function relationships.

Student task: Complete a three-column comparison for artery, vein and capillary using: direction, wall, lumen, valves, pressure, main job.

Suggested answers: Artery: away from heart; thick wall; narrower lumen; no internal valves along most of its length; high pressure; distribution. Vein: toward heart; thinner wall; wider lumen; valves often present; low pressure; return. Capillary: links small arteries and veins; one-cell-thick wall; microscopic lumen; no valves; exchange.

Common misconceptions to address

- The colour of a vessel in a diagram does not define whether it is an artery or vein. Direction relative to the heart does.
- Capillaries are not simply “tiny veins”. They are specialised exchange vessels.
- A larger lumen does not mean blood is under greater pressure. Veins have a larger lumen but lower pressure than arteries.

Differentiation

- Support: provide a word bank: thick, thin, narrow, wide, valve, exchange, high pressure, low pressure.
- Challenge: ask students to predict what would happen to exchange if capillary walls became much thicker.

Plenary — Which vessel am I?

- Read clues such as “I have valves”, “My wall is one cell thick”, or “I carry blood away from the heart”. Students identify and justify the vessel.

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CIRCULATORY SYSTEM

► **INCLUDED**

- 35-Slide Teaching PowerPoint
  - Why we need a circulatory system
  - The heart and blood flow
  - Arteries, veins and capillaries
  - Components of blood
  - Pulse rate and exercise
  - Respiratory, digestive and circulatory systems working together
  - Unit review and retrieval activities

- Six-Lesson Teacher Notes
  - Learning objectives
  - Key vocabulary
  - Slide-by-slide teaching guidance
  - Suggested questions and student responses
  - Practical activities
  - Common misconceptions
  - Differentiation and extension ideas
  - Lesson plenaries

- 10-Page Student Activity Booklet

Students apply their learning through:

  - blood-flow sequencing
  - structure and function comparisons
  - blood-component activities
  - data interpretation
  - pulse-rate graphing
  - oxygen and nutrient pathways
  - systems-thinking questions
  - unit review activities

- Standalone Pulse-Rate Investigation

Students investigate how exercise affects heart rate by:

  - making a prediction
  - measuring resting and post-exercise pulse
  - recording recovery data
  - constructing a graph
  - analysing results
  - drawing a scientific conclusion

► DESIGNED FOR

- Ages 11–14
- Middle School Science
- KS3 Science
- Grades 6–8
- General Biology
- Home school Science
- Human Body Systems units



► RESOURCE STYLE

The PowerPoint uses photorealistic, age-appropriate scientific visuals with minimal text so students can observe, predict, discuss and explain rather than simply copy information from slides.

FILE FORMAT

Digital teaching resource supplied as PowerPoint and PDF documents.

All PDF documents are supplied in two sizes: A4 and US Letter

Circulatory System Package $8.96

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