Parallel circulation, shunt flow, and oxygen delivery — review sheet

Use this after attempting the worked examples and practice. Explain each claim in words before calculating.

Key ideas

- Topology determines available routes; pressures and constitutive rules determine flow.
- A signed negative flow reverses the chosen positive arrow.
- Parallel branch flows add to total flow.
- Oxygen content, saturation, delivery and consumption are different quantities.
- Project ideas are due by meeting 6.

Common errors and repairs

Every circuit segment must carry total pump output. That holds for the ideal serial loop, not each parallel branch.

A blue arrow means blood is blue. Blood is red; diagram colors are conventions and are not required here.

Higher content proves greater delivery. Multiply content by the relevant flow and state the model assumptions.

Retrieve without your notes

- What happens to the split when both resistances are equal?
- What extra rule distinguishes a valve from a resistor?
- Can the parallel toy select a Fontan intervention?

Readiness check

- Trace the serial normal route and an explicitly simplified parallel single-pump route.
- Apply a signed pressure-drop rule and conserve flow at a junction.
- Calculate an oxygen-content mixture and distinguish content from delivery rate.
- Identify why topology and synthetic parameters alone cannot select a clinical intervention.