# Conservation of volume — review sheet

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

## Key ideas

- Choose a question and boundary before calculating.
- A stock has amount units; a rate has amount/time units.
- Final storage = initial storage + total entry - total exit.
- Equal flows maintain storage even when fluid moves.
- An internal transfer cancels when the boundary includes both regions.
- Numerical checks and measurements test different claims.

## Common errors and repairs

**Adding a rate directly to a volume.** Multiply the rate by a compatible elapsed time first.

**Counting internal flow as a loss from the combined system.** Cancel the matched departure and arrival.

**Accepting a negative stored volume because the arithmetic ran.** Locate the emptying event and revise the outflow assumption.

## Retrieve without your notes

- What units distinguish volume from flow?
- Can 100 mL/min enter a steady-volume reservoir?
- What independent evidence would challenge a correct budget program?

## Readiness check

- State a modeling question, a system boundary and two explicit assumptions.
- Distinguish stored volume from volume flow using units.
- Compute accumulation over an interval and check a complete volume budget.
- Explain why a steady stored volume can coexist with moving fluid.
- Name a measurement that could challenge the model.