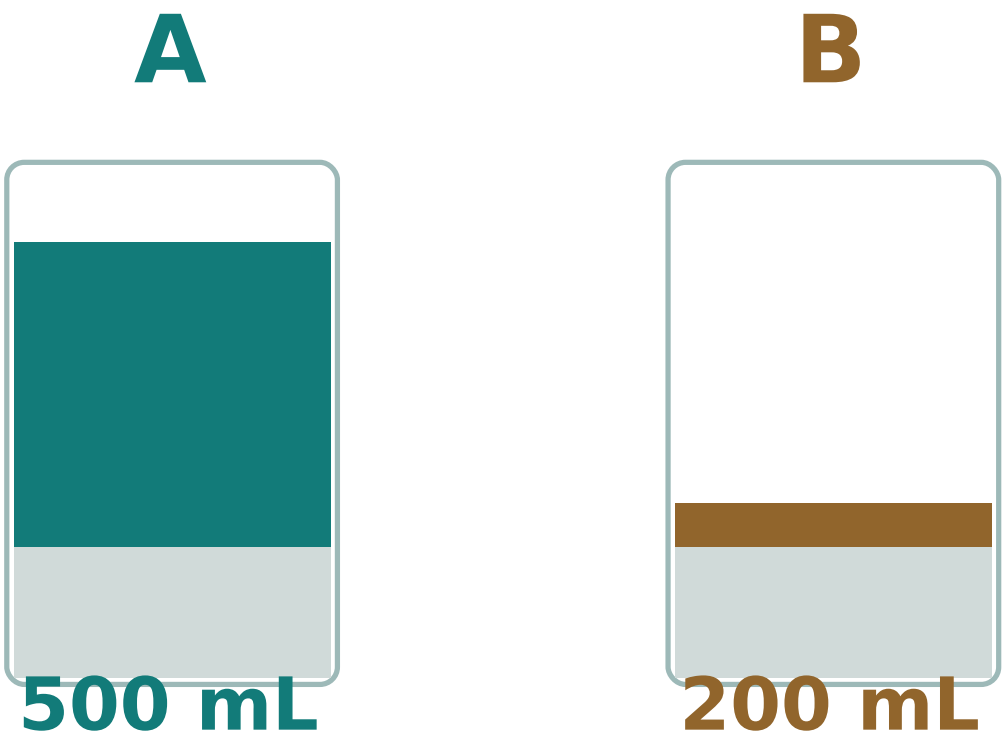
EMT-U12 / SEE THE CONCEPT

The same minute volume. Different useful ventilation.

Read the visual model, then test the reasoning.

ONE BREATH: SUBTRACT DEAD SPACE



Fixed dead space: 150 mL/breath

Dead space applies to every breath, not once per minute.

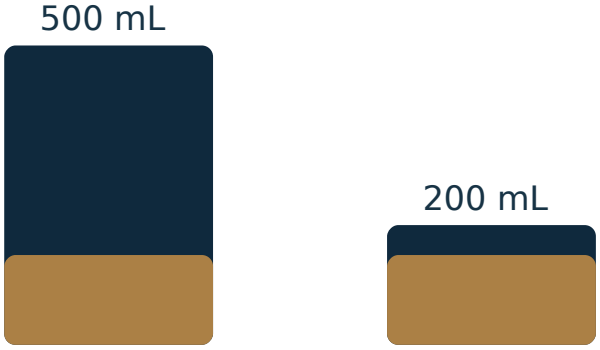
In a simplified model, A breathes 12/min at 500 mL/breath; B breathes 30/min at 200 mL/breath. Both use fixed dead space of 150 mL/breath. These supplied volumes are invented teaching data.

EMT-U12 / WORK THE CASE

The same minute volume. Different useful ventilation.

Follow the stated conditions. Check the answer against the original case.

PER-BREATH MODEL / FIXED DEAD SPACE 150 mL



12/min — 4,200 mL/min

30/min — 1,500 mL/min

Useful modeled rate: 4.2 L/min versus 1.5 L/min.

BOTH TOTAL 6,000 mL/min

Navy: modeled useful volume per breath

Gold: dead space in every breath

1 COUNT TOTAL MOVEMENT

Minute volume = rate × tidal volume. A: 12 × 500 = 6,000 mL/min. B: 30 × 200 = 6,000 mL/min.

2 SUBTRACT PER BREATH

Modeled alveolar volume: A = 12 × (500 - 150) = 4,200 mL/min; B = 30 × (200 - 150) = 1,500 mL/min.

3 COMPARE THE USEFUL SHARE

B has 1,500/4,200 = 5/14, about 35.7%, of A’s modeled useful volume despite equal total minute volume.

TEST YOUR REASONING

Why is subtracting 150 once from minute volume wrong?

Dead space applies to every breath. Subtract it from each tidal volume first, then multiply by breaths per minute.

Assume Vt exceeds fixed Vd. This model does not measure real gas exchange, perfusion or patient volumes; assess patient findings, effective chest rise and trained monitoring. Values are not clinical targets.