Ventilation and pressure changes

Student activity • observation and reasoning

YEAR 10 / LESSON 55 / BIOLOGY + SCIENCE (DOUBLE AWARD)

The question

Why does air enter and leave the lungs?

Use the supplied examples, record your reasoning and correct it using evidence.

Equipment

- Student booklet, pencil and ruler
- Teacher-provided labelled thorax and bell-jar diagrams

Paper, modelling and written reasoning only. No chemicals or biological samples are handled.

Course coverage: Shared Biology / Double Award: 2.46–2.47. Thorax and ventilation.

Plan, model or apparatus sketch

Draw and label the apparatus or biological model; identify one limitation.

Method and reasoning

Read the whole sequence before starting

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1. Label ribs, intercostal muscles, diaphragm, trachea, bronchi, bronchioles, alveoli and pleural membranes.

2. Trace the air pathway from trachea to alveoli, distinguishing ventilation from gas exchange.

3. Explain how diaphragm contraction and external intercostal contraction increase thoracic volume during inspiration.

4. Link increased volume to lower pressure than outside, causing air to enter.

5. Explain quiet expiration using muscle relaxation, elastic recoil, reduced volume and increased pressure; distinguish this from forced expiration.

6. Evaluate a bell-jar diagram: its rigid wall does not model rib movement and its flat sheet is not a dome-shaped muscular diaphragm.

Cleanup

- Return models and keep the corrected work.

Record your evidence

Blank spaces are for your own work

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Reference and task data

Ventilation moves air into and out of lungs; gas exchange occurs across alveolar surfaces. The pleural membranes and fluid allow movement with low friction and help couple lungs to the thoracic wall. A bell-jar model illustrates pressure changes but not every anatomical feature.

Example / trial	Observation / evidence	Explanation / limit
Evidence / comparison		
Explanation		
Limit / correction		

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

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1. What happens to the diaphragm on inspiration?

2. How do the ribs move in inspiration?

3. What happens to thoracic volume?

4. Why does air enter?

5. How does quiet expiration occur?

6. Give one bell-jar limitation.