BIOLOGY YEAR 11 - MODULE 2 - LESSON 15

# Gas Exchange Between Internal and External Environments

Use this worksheet after reading the lesson to practise the key ideas and prove you can meet the success criteria.

Name _____

Date _____

Class _____

## 1. Key Ideas

Before we explain the mechanism, look at the data. The numbers tell a story about gradients, distances, and surfaces — and if you read them right, you'll understand the mechanism before you've been taught it.

- Define partial pressure and explain how it drives gas exchange
- Explain gas exchange between the internal and external environments

## 2. Success Criteria

By the end, you should be able to:

- Define partial pressure and explain how it drives gas exchange
- Trace $O_2$ and $CO_2$ movements from external air to mitochondria
- Explain the role of the cardiovascular system in maintaining gradients

## 3. Key Terms

**enables efficient gas exchange**
tested in nearly every HSC paper — 4–6 marks in Section II

**Rate of diffusion**
proportional to SA × concentration gradient / membrane thickness

**Diffusion**
driven by partial pressure gradients, not absolute amounts

**The key**
the gradient, not the total oxygen content

**Partial pressure**
the pressure exerted by one gas in a mixture; it is directly proportional to concentration and determines the direction

**Bar length**
proportional to partial pressure; $O_2$ scale: 159 mmHg = full bar; $CO_2$ scale: 50 mmHg = full bar

## 4. Activity: Build the Lesson Map

Use the lesson to complete the table. Keep answers brief but specific.

| Prompt | Your answer |
| --- | --- |
| Main concept | |
| Important example | |
| Common mistake to avoid | |
| How this links to the next lesson | |

## 5. Short Answer Questions

**1. 6. Explain the role of blood flow in maintaining efficient gas exchange across the alveolar membrane. In your answer, describe what would happen to gas exchange if blood flow stopped.**

BAND 3 3 MARKS

**2. 7. Use Fick's law to explain how pulmonary oedema (fluid accumulation between alveoli and capillaries) impairs gas exchange.**

BAND 4 3 MARKS

**3. 8. Distinguish between external gas exchange and internal gas exchange. In your answer, state where each occurs, which gases move in which direction, and what drives each exchange.**

BAND 5 4 MARKS

## 6. Extend: Apply the Idea

BAND 5/6 5 MARKS

**A student gives a memorised answer about Gas Exchange Between Internal and External Environments but does not use evidence or reasoning.**

Improve the answer by writing a stronger response that uses accurate terminology, a relevant example and a clear explanation.

## 7. Multiple Choice

**1.** What is the best first step when answering a question about Gas Exchange Between Internal and External Environments?

☐ A. Identify the key concept being tested

☐ B. Write every fact from memory

☐ C. Ignore the command word

☐ D. Skip examples and evidence

**2.** Which answer would show stronger understanding of Gas Exchange Between Internal and External Environments?

☐ A. An answer with accurate terms and reasoning

☐ B. A copied definition only

☐ C. A single-word response

☐ D. An answer with no example

**3.** What should you do if a question asks you to explain?

☐ A. Link the idea to a reason or cause

☐ B. List unrelated facts

☐ C. Only draw a diagram

☐ D. Write the shortest possible answer

## 8. Success Criteria Proof

Finish with evidence that you can do each success criterion.

**SUCCESS CRITERION 1**

**Prove that you can: Define partial pressure and explain how it drives gas exchange**

BAND 3 2 MARKS

**SUCCESS CRITERION 2**

**Prove that you can: Trace $O_2$ and $CO_2$ movements from external air to mitochondria**

BAND 4 3 MARKS

**SUCCESS CRITERION 3**

**Prove that you can: Explain the role of the cardiovascular system in maintaining gradients**

BAND 5 4 MARKS

**One thing I still need help with:**