

Exercise walk-through

12.1

Respiration

IGCSE Biology

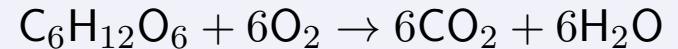
Aerobic respiration



Aerobic respiration releases energy steadily for sustained exercise.

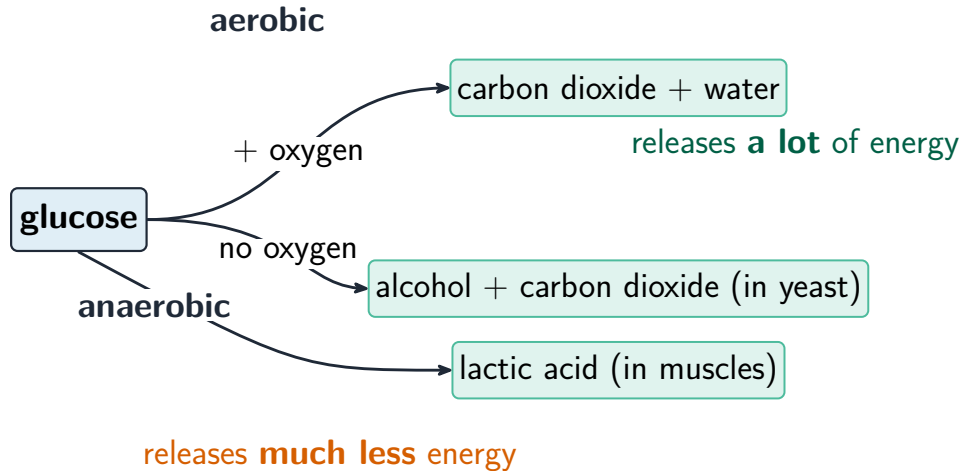
Word equation:

glucose + oxygen → carbon dioxide + water



Aerobic respiration releases far more energy per glucose molecule than anaerobic respiration.

Anaerobic respiration



Anaerobic respiration

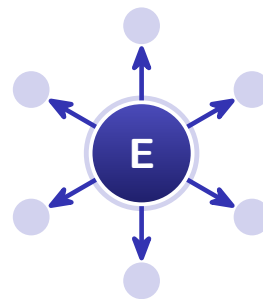
works **without** oxygen, giving **much less** energy.

- yeast: glucose $\rightarrow$ **alcohol** + CO₂
- muscle: glucose $\rightarrow$ **lactic acid**

Both yeast products are used: the CO₂ makes **bread** rise, and the alcohol is what **brewing** is for.

Check yourself

- 1 Where in the body does respiration happen?
- 2 What are the products of aerobic respiration?
- 3 What does anaerobic respiration make in muscles?
- 4 Which organ breaks down lactic acid?



Answers 1. in every living cell 2. carbon dioxide & water 3. lactic acid 4. the liver

Exercises 2.1·2.2

2.1 Define respiration.

[1]

2.2 State two uses cells make of the energy from respiration.

[2]

Exercises 2.1-2.2

2.1 Define respiration.

[1]

2.1

- respiration is the **release of energy from food** in cells

2.2 State two uses cells make of the energy from respiration.

[2]

2.2

- any **two** of: muscle contraction / protein synthesis / cell division / active transport / growth / nerve impulses / keeping warm

Exercise 3.1

3.1 Respiration takes place in:

[1]

☐

A the lungs only

B all living cells

C the blood only

D the air spaces

Exercise 3.1

3.1 Respiration takes place in:

[1]

☐

A the lungs only

B all living cells

C the blood only

D the air spaces

3.1 B

- respiration takes place in **all living cells**
- A is gas exchange; C and D are wrong

Exercise 3.2 (a)

3.2 Respiration is often confused with breathing.

(a) State the difference between respiration and breathing.

[2]

Exercise 3.2 (a)

3.2 Respiration is often confused with breathing.

(a) State the difference between respiration and breathing.

[2]

(a)

- **respiration:** energy released from food in cells
- **breathing:** air in and out of the lungs

Exercise 3.2 (b)

3.2 Respiration is often confused with breathing.

(b) In a yeast experiment, explain why warmer yeast gives off carbon dioxide faster (up to a point). [2]

Exercise 3.2 (b)

3.2 Respiration is often confused with breathing.

(b) In a yeast experiment, explain why warmer yeast gives off carbon dioxide faster (up to a point). [2]

(b)

- warmer yeast enzymes work faster, so it **respires faster**
- more **carbon dioxide** is given off

Exercise 3.3 (a)

3.3 Respiration and breathing are often confused.

(a) Write the word equation and the balanced symbol equation for aerobic respiration.[3]

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(a)

- glucose + oxygen $\rightarrow$ carbon dioxide + water
- $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O}$

Exercise 3.3 (b)

3.3 Respiration and breathing are often confused.

(b) State **three** ways in which a cell uses the energy released by respiration. [3]

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3.3 Respiration and breathing are often confused.

(b) State **three** ways in which a cell uses the energy released by respiration. [3]

(b)

- **muscle contraction**
- **building large molecules** (e.g. proteins)
- **active transport** / cell division / keeping warm

Exercise 3.3 (c)

3.3 Respiration and breathing are often confused.

(c) Explain the difference between respiration and breathing.

[3]

Exercise 3.3 (c)

3.3 Respiration and breathing are often confused.

(c) Explain the difference between respiration and breathing.

[3]

(c)

- respiration is a **chemical reaction in every living cell**
- breathing is the **movement of air** in and out of the lungs
- breathing supplies oxygen and removes CO_2 , but **releases no energy**

Exercise 3.3 (d)

3.3 Respiration and breathing are often confused.

(d) A student says “plants respire only at night”. Explain why this is wrong.

[3]

Exercise 3.3 (d)

3.3 Respiration and breathing are often confused.

(d) A student says “plants respire only at night”. Explain why this is wrong. [3]

(d)

- plants respire **all the time**, day and night
- in daylight they also photosynthesise, usually **faster** than they respire
- they take in more CO_2 than they release, so it **looks** as if they are not respiring