



Objective : Compare between aerobic and anaerobic respiration

Resources:

Book pages 128 , 129

Workbook page 57

<https://www.youtube.com/watch?v=04cUKimk5GA> aerobic and anaerobic new

# Aerobic and anaerobic respiration:

**Respiration is obtaining energy from food .**

❖ **Aerobic respiration** : Is the form of respiration which uses oxygen. It can be summarised by this equation:

**Glucose + Oxygen → Carbon Dioxide + Water (+ energy)**

Aerobic respiration happens in animals and plants.

❖ **Anaerobic respiration** : Occurs in the absence of oxygen .

**Example :**

1. Yeast and bacteria .
2. In animals when not enough oxygen may reach the muscles during heavy exercise.

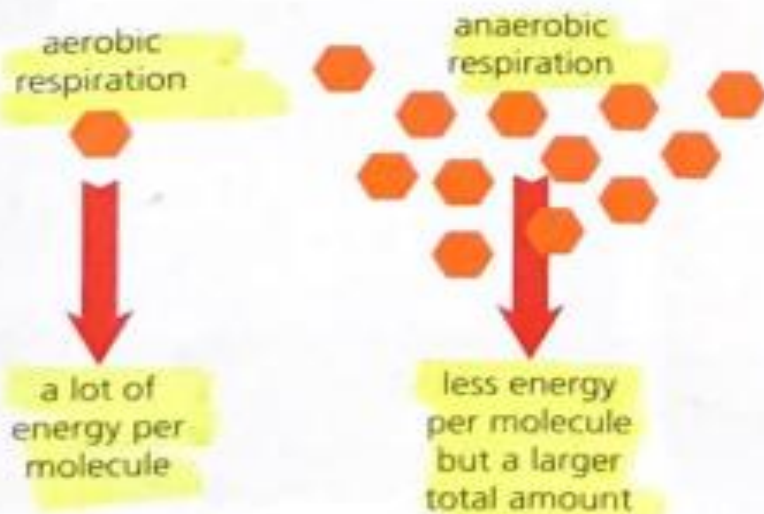
When this happens, they use anaerobic respiration to get energy.

The waste product in muscles is ***lactic acid*** rather than carbon dioxide and water:

**glucose → lactic acid (+ little energy).**

## Respiration

We usually use oxygen for respiration. The reaction shown in this equation shows what happens – it is called **aerobic respiration**. It releases all the energy stored in glucose molecules.



↑ Anaerobic respiration can provide a quick burst of energy.

Aerobic respiration can only release energy as fast as blood can bring oxygen to cells. Usain's races are over in seconds. He needs a lot of energy fast. His muscle cells store fuel but they can't store oxygen, and he can't wait for his blood to bring it.

When muscles work hard for less than 2 minutes they get most of their energy from a different method of respiration. It doesn't need oxygen so it is called **anaerobic respiration**.

Anaerobic respiration only releases 5% of the energy in glucose. The glucose isn't completely broken down. But cells can use a lot of glucose molecules at once, and 5% of their total energy is a lot.

Usain's muscles specialise in anaerobic respiration. All runners use anaerobic respiration when they start running, or speed up to cross the finish line. Anaerobic respiration lets cells release extra energy but it cannot be used for long periods.

### Lactic acid

Anaerobic respiration has one major disadvantage. It makes lactic acid instead of carbon dioxide. Lactic acid is toxic if it builds up, so anaerobic respiration can't continue at full speed for more than a couple of minutes.

When a runner stops, they continue to breathe fast. The extra oxygen they take in after a race removes lactic acid and helps the muscles recover.

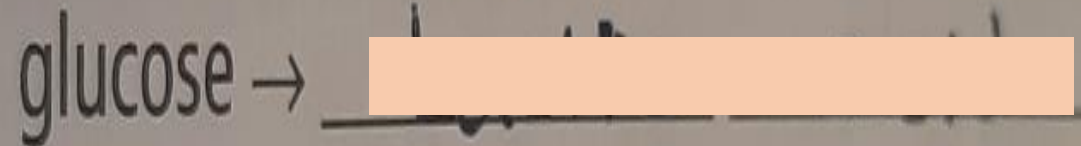
# Workbook page 57 / question 1 :

Complete the equations for aerobic and anaerobic respiration.

Aerobic:



Anaerobic:



# Workbook page 57 / question 3

Write *T* after the true statements and *F* after those that are false. Then write corrected versions of the statements that are false.

- a Anaerobic respiration does not require oxygen.
- b Aerobic respiration only provides short bursts of energy.
- c Anaerobic respiration produces lactic acid.
- d Anaerobic respiration releases the same percentage of the total energy in glucose as aerobic respiration.
- e Anaerobic respiration is the main type used in marathons.

Corrected versions of false statements:

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..... of each statement in the correct part of the