

Answers

Ventilation of the lungs

Definition of the process to describe:

Ventilation of the lungs is the process by which air is inhaled into and exhaled out of the lungs. This process is the first stage in respiration.

Description sequence:

When we inhale, air containing 21% oxygen enters the respiratory system through the mouth and the nose. The air passes through the larynx and the trachea into the two bronchi, which divide into many bronchioles. The air gets into the bronchioles, which connect to tiny sacs called alveoli. The air then goes into the alveoli, where gaseous exchange takes place. When we exhale, air containing less oxygen but much more carbon dioxide goes back from the alveoli to the bronchioles and then to the bronchi. From the bronchi, air goes up the trachea and the larynx and then goes out of the respiratory system through the mouth and the nose.

Process explanation for breathing mechanism

Content objective:

Students should be able to explain how air is forced into and out of the lungs by the intercostal muscles, the diaphragm and the ribs.

Knowledge structures:

sequence + cause-effect

Text structure:

process explanation [Definition of the process to explain ^ Explanation sequence]

Language objective:

Students should be able to write a process explanation to explain how air is forced into and out of the lungs.

Sentence structures:

When contract, ... move

This causes

Vocabulary:

intercostal muscles, diaphragm, dome shaped

Definition of the process to explain:

Air is forced into and out of the lungs by the ribs, the intercostal muscles and the diaphragm.

Explanation sequence:

When the intercostal muscles contract, the ribs move upwards and outwards and the diaphragm becomes flattened. This causes the volume of the chest to increase and the pressure inside the chest therefore decreases. Air is therefore drawn in.

When the intercostal muscles relax, the ribs move downwards and inwards and the diaphragm becomes dome shaped. This causes the volume of the chest to decrease and pressure inside the chest therefore increases. Air is therefore pushed out.

Gaseous exchange

Content objectives:

1. Students should be able to show understanding of what gases are exchanged in our lungs and how this takes place.
2. Students should be able to describe the factors facilitating gaseous exchange in our lungs.

Knowledge structures:

1. process?
2. cause-effect

Language objectives:

Students should be able to use noun phrases to describe the factors facilitating gaseous exchange in our lungs:

The (microscopic) size and the (large) number of alveoli in the lungs

The (thin) boundary between the alveoli and the capillaries

Tissue respiration

Language objectives:

1. Students should be able to use the following sentence structure to explain the word equations of anaerobic respiration.

... is/are turned into ..., releasing

2. Students should be able to use the following sentence structure to write a definition of respiration.

Respiration is the process by which

Comparing aerobic and anaerobic respiration

Content objective:

Students should be able to explain the differences between aerobic and anaerobic respiration.

Knowledge structure:

Comparison and contrast

Text structure:

Comparison-contrast [Statement of the comparison ^Points of comparison ^Summary of comparison]

Language objective:

Students should be able to write a comparison-contrast text to explain the differences between aerobic and anaerobic respiration.

Aerobic respiration takes place when _____.

Anaerobic respiration takes place when you need more _____

_____.

The amount of energy produced in _____ respiration is greater than _____

_____. In both aerobic and anaerobic respiration, _____

and _____ are produced. In aerobic respiration, _____ is also

produced while in anaerobic respiration, another waste product is _____.

Respiration and photosynthesis in plants

Statement of comparison:

Both photosynthesis and respiration take place in green plants and both involve gaseous exchange. Respiration takes place all the time but photosynthesis only occurs when there is light. The rate of gaseous exchange depends on the light conditions.

Points of comparison:

In bright light, such as on a sunny day, photosynthesis occurs quickly and respiration occurs at the same time. The plant releases oxygen and takes in carbon dioxide through photosynthesis and releases carbon dioxide and takes in oxygen through respiration. In these light conditions, more oxygen is released by photosynthesis than is taken in by respiration. More carbon dioxide is released by respiration than is taken in by photosynthesis.

In darkness, such as at night, respiration continues but photosynthesis does not occur. The plant only releases carbon dioxide and only takes in oxygen.

In dim light, respiration continues and photosynthesis occurs slowly. The plant releases oxygen and takes in carbon dioxide through photosynthesis and releases carbon dioxide and takes in oxygen through respiration. In these light conditions, about the same amount of oxygen is released by photosynthesis as is taken in by respiration. About the same amount of carbon dioxide is released by respiration as is taken in by photosynthesis.

Summary of comparison:

In bright light there is a net intake of carbon dioxide and a net release of oxygen in green plants. In darkness they only take in oxygen and release carbon dioxide. In dim light the plant may take in about the same amount of oxygen through respiration as it releases through photosynthesis. It may take in about the same amount of carbon dioxide through photosynthesis as it releases through respiration.