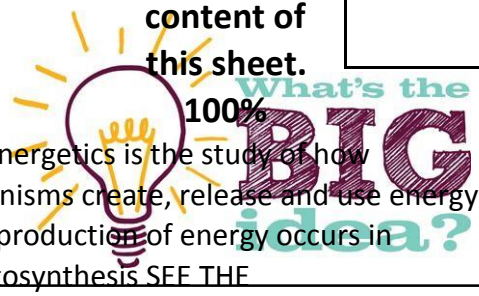
100% Sheet
BIOENERGETICS

You need to know the content of this sheet. 100%



Organisms

Organisms are organized on a cellular basis and require a supply of energy or materials.

Bioenergetics is the study of how organisms create, release and use energy. The production of energy occurs in photosynthesis SEE THE 100% SHEET 'PLANT GROWTH AND PHOTOSYNTHESIS FOR THIS SECTION'.

Aerobic and anaerobic respiration: Aerobic respiration occurs with oxygen and produces a lot of energy. Anaerobic respiration occurs when there is no oxygen and releases only a small amount of energy and produces lactic acid.

Respiration occurs in all living organisms and is the process of releasing energy from glucose. Aerobic respiration occurs in the mitochondria of cells –this is where the energy is released from. It is an exothermic reaction. Energy is required to produce body heat, allow movement and maintain chemical reactions (the body's metabolism).

Aerobic respiration:

glucose + oxygen → carbon dioxide + water
(+ energy)

Anaerobic respiration:

glucose → lactic acid (+ little energy)

breaking down lactic acid:
oxygen + lactic acid → carbon dioxide and water

Exercise

During exercise, the muscle cells respire more than they do at rest. This means that:

Oxygen and glucose must be delivered to them more quickly
Waste carbon dioxide must be removed more quickly
This is achieved by increasing the heart rate, rate of breathing and the depth of breathing.

The increased heart rate increases the rate of blood flow around the body. The increased rate and depth of breathing increases the rate of *gaseous exchange* in the lungs.

The muscles store glucose as glycogen. This can then be converted back to glucose for use during exercise.

Take care not to get confused: plants store glucose as starch and animals store it as glycogen. In addition, respiration and breathing are not the same thing: respiration releases energy, while breathing lets air into and out of our lungs.

Muscle fatigue

Muscles become fatigued (tired) during long periods of vigorous activity. This means that they stop contracting efficiently.

Fitness versus health

Fit people are able to carry out physical activities more effectively than unfit people. Their pulse rate is likely to return to normal more quickly after exercise.

Oxygen debt - Higher tier

Much less energy is released during anaerobic respiration than during aerobic respiration.

Write the equations for aerobic and anaerobic respiration – describe the differences between them.

Describe and explain the effect of exercise in the body. In your answer include the following keywords:

Oxygen glucose energy blood heart rate lungs

Breathing increase carbon dioxide

What is respiration? Why is it important?

Compare photosynthesis and respiration: