THE STRIVING

MUSLIM ACADEMY

Islamic and Academic Education

YEARS 7 TO 9 · SCIENCE

Photosynthesis, respiration and ecosystems

The trade a plant makes, the reverse trade every cell makes, and where the energy goes after that.

WHAT IS INSIDE

- Photosynthesis, as a trade
- Respiration, the other direction
- Where the energy goes after that
- Photosynthesis, respiration and the flow of energy
- How each one is answered

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1 sets · a hint on every question

Written for a parent teaching at home. No training assumed, and nothing else to buy.

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Respiration, the other direction

Read this, then answer the questions on it.



RESPIRATION, THE OTHER DIRECTION

Respiration is the reverse trade: sugar is broken down, with oxygen taking part, and the energy released is captured.

The energy does not go straight into movement or growth. It is captured in ATP, which is the form a cell can actually spend, and nearly every living thing gets its energy this way, plant or animal.

Aerobic respiration uses oxygen. Anaerobic respiration happens without it, and both processes allow organisms to convert energy for their use in the absence of oxygen. Each anaerobic route leaves a product behind: lactic acid in a working muscle, and in yeast the fermentation of pyruvic acid produces ethanol, releasing carbon dioxide as a gas.

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Where the energy goes after that

Read this, then answer the questions on it.



WHERE THE ENERGY GOES AFTER THAT

Ecology is the study of how organisms interact with each other and with their environment, and it is studied at several levels: the individual organism, the population, the community and the ecosystem.

An ecosystem has biotic parts, the living ones, and abiotic parts, the non-living ones: water, light, temperature, minerals.

Energy flows through it in one direction. Producers capture it by photosynthesis, consumers get it by eating, and at every step only a small share passes on. That loss is why food chains are usually short: after four to six transfers there is not enough energy left to support another level.

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How each one is answered

Mark it together. Where a question asks for a list, the order does not matter.



PHOTOSYNTHESIS, RESPIRATION AND THE FLOW OF ENERGY

1. Write the word summary for photosynthesis.

1. The reactants are carbon dioxide and water.
2. Light energy drives the process.
3. The products are glucose and oxygen.
4. So: carbon dioxide and water, in the presence of light, become glucose and oxygen.

Answer: **carbon dioxide and water, using light, become glucose and oxygen**

2. What is glucose described as, in a cell?

1. OpenStax calls glucose the primary energy source in cells.

Answer: **the primary energy source in cells**

3. Respiration and photosynthesis are often called opposites. Say in what way that is fair and in what way it is misleading.

1. Fair: the reactants of one are close to the products of the other, and one stores energy while the other releases it.
2. Misleading: they are not a single reaction run backwards, they happen in different structures by different steps.
3. Also misleading because plants do both, all the time, rather than one or the other.

Answer: **fair in that one stores energy and the other releases it, misleading because they are not one reaction reversed and plants do both at once**

4. Name the two kinds of respiration, say which releases more energy from the same sugar, and give one product of the other.

1. Aerobic respiration uses oxygen; anaerobic does not.
2. Aerobic releases more energy from the same sugar.
3. Anaerobic leaves a product: lactic acid in muscle, or ethanol and carbon dioxide in yeast.

Answer: **aerobic and anaerobic; aerobic releases more; anaerobic leaves lactic acid, or ethanol and carbon dioxide**

5. Give the difference between the biotic and abiotic parts of an ecosystem, with two examples of each.

1. Biotic parts are the living ones: plants, animals, bacteria, fungi.
2. Abiotic parts are the non-living ones: water, light, temperature, minerals in the soil.

Answer: **biotic are living, such as plants and animals; abiotic are non-living, such as water and light**

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SAMPLE PAGES

You have read a few pages. The pack is longer.

What you are holding is a short sample, taken from different parts of the pack so that you can see how a week is planned and what a child is actually asked to do, before you decide.

The complete pack, and the rest of the academic materials, are on our website: schemes of work for a parent teaching at home, and practice packs for the skills children get stuck on.

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Our Islamic Education classes are free. These packs are part of what pays the teachers who teach them.