

A-Level Biology

Name: _____ Score: _____

1. Which is a use of energy in a cell?
 - ☐ active transport, movement, and building large molecules
 - ☐ lowering the temperature
 - ☐ removing all water
 - ☐ stopping all reactions
2. The respiratory quotient (RQ) is the ratio of CO₂ produced to:
 - ☐ oxygen used
 - ☐ water made
 - ☐ glucose used
 - ☐ ATP made
3. Glycolysis takes place in the cytoplasm, and needs no oxygen.
 - ☐ True ☐ False
4. During the Krebs cycle, what is removed?
 - ☐ carbon dioxide (decarboxylation) and hydrogen (dehydrogenation, reducing NAD and FAD)
 - ☐ only oxygen
 - ☐ only water
 - ☐ whole glucose molecules
5. Why does fermentation matter when there is no oxygen?
 - ☐ it regenerates NAD so glycolysis can keep producing some ATP
 - ☐ it makes the Krebs cycle run faster
 - ☐ it produces oxygen
 - ☐ it stops glycolysis
6. ATP is re-made from ADP and a _____ group.

7. Which respiratory substrate releases the most energy per gram?
 - ☐ lipids
 - ☐ carbohydrates

☐ proteins

☐ they all release the same

8. Each turn of the Krebs cycle removes carbon dioxide and hydrogen, reducing NAD and FAD.

☐ True ☐ False

9. An organism produces 4 molecules of CO_2 and takes in 5 molecules of O_2 . What is its RQ?

10. In mammals anaerobic respiration produces lactate, while in yeast it produces ethanol and carbon dioxide.

☐ True ☐ False

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1. **active transport, movement, and building large molecules**

Energy from respiration drives active transport, movement (e.g. muscle), and anabolic (building) reactions.

2. **oxygen used**

$RQ = \text{CO}_2 \text{ produced} \div \text{O}_2 \text{ used}$.

3. **True**

Glycolysis is in the cytoplasm and is anaerobic; the later stages (Krebs, oxidative phosphorylation) are in the mitochondria.

4. **carbon dioxide (decarboxylation) and hydrogen (dehydrogenation, reducing NAD and FAD)**

Each turn removes CO_2 (decarboxylation) and hydrogen (dehydrogenation), reducing the coenzymes NAD and FAD.

5. **it regenerates NAD so glycolysis can keep producing some ATP**

Without oxygen, NAD must be regenerated by fermentation so glycolysis can continue making ATP.

6. **phosphate**

Respiration provides the energy to re-attach the phosphate to ADP.

7. **lipids**

Lipids release the most energy per gram (most hydrogen); then proteins, then carbohydrates.

8. **True**

The reduced NAD and FAD then carry the hydrogen to oxidative phosphorylation, where most ATP is made.

9. **0.8**

$RQ = \text{CO}_2 \text{ produced} \div \text{O}_2 \text{ taken in} = 4 \div 5 = 0.8$.

10. **True**

Same problem (no oxygen), two different products: lactate in mammals, ethanol + CO_2 in yeast.