C1.2 Cell respiration (HL)

What the Cell · DP Biology · worksheet · HL statements C1.2.7–17

Name _____ **Date** _____ **Total** _____ / 40

About 40 minutes, or one section at a time. The number of marks shows how many separate points to make.

Section A: Recall

10 marks

1 **Define** oxidation in terms of hydrogen. C1.2.7 **[1]**

2 **State** the net yield of ATP and of reduced NAD from glycolysis of one glucose. C1.2.8 **[2]**

3 **State** the two products of anaerobic respiration in yeast. C1.2.10 **[2]**

4 **Name** the 4-carbon and 6-carbon compounds of the Krebs cycle. C1.2.12 **[2]**

5 **State** where the electron transport chain is found. C1.2.14 **[1]**

6 **Name** the enzyme that makes ATP as protons flow back into the matrix. C1.2.15 **[1]**

7 **State** the product formed when oxygen accepts electrons and protons. C1.2.16 **[1]**

Section B: Understanding

14 marks

8 **Explain** why muscle cells convert pyruvate to lactate when oxygen is short. C1.2.9 **[3]**

9 **Outline** the link reaction. C1.2.11 **[3]**

10 **Explain** how reduced NAD leads to a proton gradient across the inner mitochondrial membrane. C1.2.13, C1.2.14 **[3]**

11 **Explain** why lipids release more energy per gram than carbohydrates. C1.2.17 **[2]**

12 **State** why lipids cannot be used in anaerobic respiration. C1.2.17 **[1]**

13 **Explain** why glycolysis begins by using ATP. C1.2.8 **[2]**

Section C: Working with evidence

10 marks

All data in this section are invented for practice. The patterns are realistic.

14 C1.2.14, C1.2.15, C1.2.16

Mitochondria were isolated from liver cells and given a respiratory substrate. Oxygen uptake and ATP production were measured under four conditions. DNP is a substance that makes the inner membrane leaky to protons.

Condition	Oxygen uptake / nmol min^{-1}	ATP made / % of condition 2
1 Substrate only, no ADP	8	0
2 Substrate and ADP	42	100
3 Substrate, ADP and cyanide	1	0
4 Substrate, ADP and DNP	60	2

a **Explain** why adding ADP increased oxygen uptake. **[2]**

b **Explain** the results with cyanide. **[2]**

c **Explain** why oxygen uptake was high but almost no ATP was made with DNP. **[3]**

d DNP was once sold as a slimming drug, but it causes dangerous overheating. **Suggest** why. **[2]**

e **Suggest** a substrate that could be given to isolated mitochondria. **[1]**

Section D: Longer answer

6 marks

15 **Explain** how energy from reduced NAD is used to make ATP in the mitochondrion. C1.2.13–16 **[6]**