Module 8: Cellular Respiration

1. Write the balanced equation for cellular respiration: $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O +$ ATP.
2. Name the four stages: Glycolysis, Pyruvate Oxidation, Citric Acid (Krebs) Cycle, Electron Transport Chain/Oxidative Phosphorylation.
3. Where does glycolysis occur?
4. Where do pyruvate oxidation, the Citric Acid Cycle, and the ETC occur? (Be specific about mitochondrial compartments.)
5. Define chemiosmosis and oxidative phosphorylation.
6. What is the role of oxygen? Why is it called the "final electron acceptor"?
7. Starting with one glucose molecule:
8. Net ATP from glycolysis: 2
9. ATP from Citric Acid Cycle: 2
10. ATP from ETC/Oxidative Phosphorylation: 26-28
11. Why is the total ATP yield a range (30-32) rather than a fixed number?
12. If oxygen is unavailable, cells perform fermentation.
13. Compare lactic acid fermentation (animals, bacteria) and alcohol fermentation (yeast).
14. Does fermentation produce new ATP? What is its primary purpose?
15. Cellular respiration captures approximately 34% of glucose's energy in ATP. Where does the remaining energy go? (Heat, entropy)
16. Proteins and fats can enter the respiratory pathway. Where do fatty acids enter? Where do amino acids enter after deamination?