Comprehension Questions - Module 8: Cellular Respiration

Overview of Cellular Respiration

1. Explain the overall equation for cellular respiration and compare it to photosynthesis.
2. Describe the three main stages of aerobic cellular respiration and where each occurs.
3. How do cells extract energy from glucose through cellular respiration?

Glycolysis

1. Describe the process of glycolysis, including inputs, outputs, and energy production.
2. Explain why glycolysis is considered an ancient metabolic pathway.
3. How is glycolysis regulated, and why is this regulation important?

Citric Acid Cycle (Krebs Cycle)

1. Describe the citric acid cycle and explain how it completes the oxidation of glucose.
2. What happens to pyruvate before it enters the citric acid cycle?
3. Explain how the citric acid cycle generates ATP, NADH, and FADH2.

Electron Transport Chain and Oxidative Phosphorylation

1. Describe how the electron transport chain creates a proton gradient across the mitochondrial membrane.
2. Explain how ATP is synthesized through chemiosmosis.

3. Compare and contrast the electron transport chains in cellular respiration and photosynthesis.

Anaerobic Respiration and Fermentation

1. Compare and contrast aerobic respiration, anaerobic respiration, and fermentation.
2. Explain why fermentation is less efficient than aerobic respiration but still important for some organisms.
3. Describe the different types of fermentation and their products.

Energy Yield and Efficiency

1. Calculate the total ATP yield from one molecule of glucose through aerobic respiration.
2. Explain how cells can use other molecules besides glucose as fuel for cellular respiration.