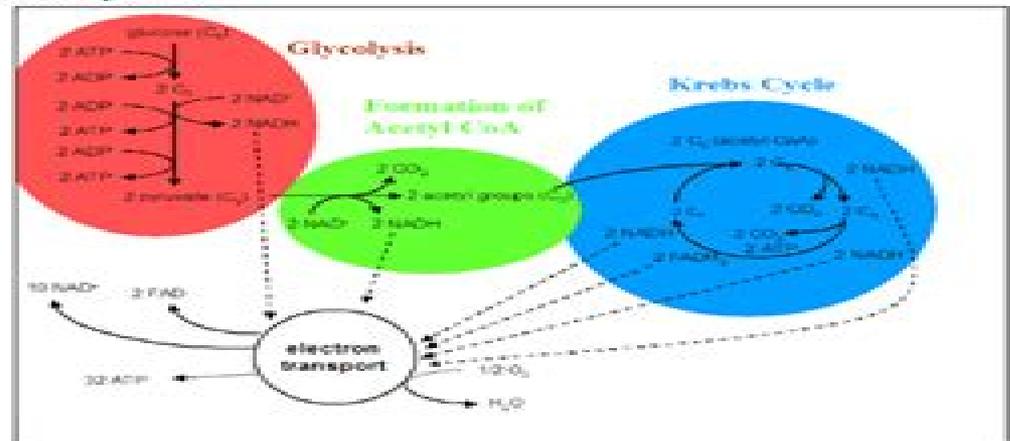
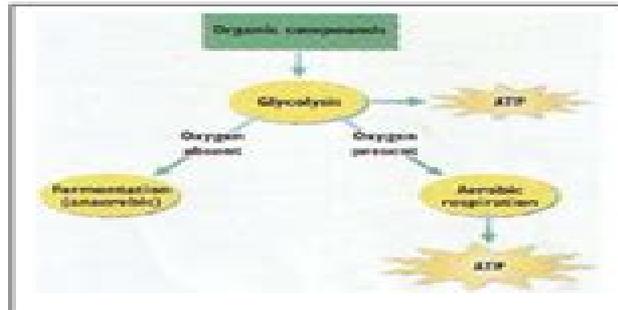


# AP BIOLOGY – CHAPTER 7 Cellular Respiration Outline

## I. How cells get energy:

### A. Cellular Respiration

1. **Cellular respiration** includes the various metabolic pathways that break down carbohydrates and other metabolites and build up ATP.



2. Cellular respiration requires oxygen and gives off CO<sub>2</sub>.
3. Aerobic respiration usually breaks down glucose into CO<sub>2</sub> and H<sub>2</sub>O.
4. Overall equation for complete breakdown of glucose requires oxygen (is aerobic):  

$$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{energy}$$
5. Glucose is high-energy molecule; CO<sub>2</sub> and H<sub>2</sub>O are low-energy molecules; process is exergonic and releases energy.
6. Electrons are removed from substrates and received by oxygen, combines with H<sup>+</sup> to become water.
7. Glucose is oxidized and O<sub>2</sub> is reduced.
8. Buildup of ATP is an endergonic reaction that requires energy.
9. Pathways of aerobic respiration allow energy in glucose to be released slowly; ATP is produced gradually.
10. Rapid breakdown of glucose would lose most energy as non-usable heat.
11. Breakdown of glucose yields synthesis of 36 or 38 ATP; this preserves 39% of energy available in glucose.

### B. NAD<sup>+</sup> and FAD

1. Each metabolic reaction in cellular respiration is catalyzed by its own enzyme.
2. As a metabolite is oxidized, NAD<sup>+</sup> accepts two electrons and a hydrogen ion (H<sup>+</sup>); results in NADH + H<sup>+</sup>.
3. Electrons received by NAD<sup>+</sup> and FAD are high-energy electrons and are usually carried to the electron transport system.
4. NAD<sup>+</sup> is a coenzyme of oxidation-reduction since it both accepts and gives up electrons.
5. Only a small amount of NAD<sup>+</sup> is needed in cells; each NAD<sup>+</sup> molecule is used over and over.
6. FAD coenzyme of oxidation-reduction can replace NAD<sup>+</sup>; FAD accepts two electrons, becomes FADH<sub>2</sub>.

This is only a general outline. There is much that has been discussed and presented in lecture that is not included in this outline. All material discussed in lecture is test-material whether or not it is included in this outline.

# Ap Bio Cellular Respiration Study Guide

**Princeton Review (Firm)**



## **Ap Bio Cellular Respiration Study Guide:**

**Biology**, 1999      **Critical Care Study Guide** Gerard J. Criner, Gilbert E. D'Alonzo, 2013-03-09 Critical care medicine is a dynamic and exciting arena where complex pathophysiologic states requiring extensive knowledge and clinical acumen are commonly found. Caring for critically ill patients requires an extensive knowledge of basic pathophysiology as well as awareness of the appropriate diagnostic tests and therapeutic interventions. Because this knowledge base crosses many different disciplines, introduction to caring for the intensive care patient while exciting may also be intimidating. This textbook is designed toward making the dynamic environment of the critical care unit understandable and the approach to the patient both logical and successful. The book contains three components: 1) description of the procedural tasks commonly performed for the critically ill patient; 2) explanation of the most common pathophysiologic states encountered; and 3) description of specific disease entities with details of their differential diagnosis, diagnostic strategy, and therapeutic plan. This book also uses several educational approaches that we have found useful in our own teaching sessions and prior textbooks. Clinical cases introduce chapters and highlight chapter segments to emphasize clinical relevancy. As an additional study aid, margin notes highlight important teaching points and facilitate easy review of chapter content. To consolidate the principles outlined in each chapter, review questions with full text explanations are provided at the end of each chapter. All these elements help reinforce the most important messages for the reader.

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Learnerator Education, 2015-05-06 Learn Key AP Biology Concepts in Under an Hour Read on your PC, Mac, smartphone, tablet, or Kindle device. In *AP Biology: 21 Must Know Concepts to Ace the Test*, you'll learn many of the most frequently tested concepts for AP Biology, including but not limited to Endosymbiosis, the Hardy Weinberg Equation, and Mendelian Genetics. This book covers not only what these concepts are but why they are important in the context of AP Biology. These articles were originally posted on the Learnerator blog and were compiled in no particular order. If you feel like you have no idea where to start when it comes to AP Biology prep, read this book to begin understanding 21 key concepts for the AP Biology exam. Grab your copy today. Here is a preview of what is inside this book: Introduction, Abiogenesis, Anaerobic Respiration, Animal Behavior, Cell Organelles, Diffusion, Osmosis, Dissolved Oxygen, DNA Replication, Endocrine System, Endosymbiosis, Enzymes, Hardy Weinberg Equation, Heredity, Immune Systems, Kingdoms, Krebs Cycle, Lipids, Mendelian Genetics, Mitosis and Meiosis, Nucleic Acids, Scientific Method, Transcription and Translation, Conclusion. An excerpt from the book: Anaerobic respiration is how cells make energy when, as you may have guessed from the name, there is no available oxygen. In fact, for this process, there is neither oxygen nor mitochondria present. The two processes that allow this to work are those of glycolysis and fermentation. In cellular respiration, what we normally see is glucose breaking down to pyruvate, and from this process, we net 2 ATP. Next, the pyruvate will go into the mitochondria and enter the Krebs cycle. In the process of being converted to acetyl CoA, CO<sub>2</sub> is given off, and another 2 ATP are made. This energy is stored in NADH and FADH<sub>2</sub>. Their electrons move into the

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## **Table of Contents Ap Bio Cellular Respiration Study Guide**

1. Understanding the eBook Ap Bio Cellular Respiration Study Guide
  - The Rise of Digital Reading Ap Bio Cellular Respiration Study Guide
  - Advantages of eBooks Over Traditional Books
2. Identifying Ap Bio Cellular Respiration Study Guide
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Ap Bio Cellular Respiration Study Guide
  - User-Friendly Interface
4. Exploring eBook Recommendations from Ap Bio Cellular Respiration Study Guide
  - Personalized Recommendations
  - Ap Bio Cellular Respiration Study Guide User Reviews and Ratings
  - Ap Bio Cellular Respiration Study Guide and Bestseller Lists
5. Accessing Ap Bio Cellular Respiration Study Guide Free and Paid eBooks
  - Ap Bio Cellular Respiration Study Guide Public Domain eBooks

- Ap Bio Cellular Respiration Study Guide eBook Subscription Services
- Ap Bio Cellular Respiration Study Guide Budget-Friendly Options
- 6. Navigating Ap Bio Cellular Respiration Study Guide eBook Formats
  - ePub, PDF, MOBI, and More
  - Ap Bio Cellular Respiration Study Guide Compatibility with Devices
  - Ap Bio Cellular Respiration Study Guide Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Ap Bio Cellular Respiration Study Guide
  - Highlighting and Note-Taking Ap Bio Cellular Respiration Study Guide
  - Interactive Elements Ap Bio Cellular Respiration Study Guide
- 8. Staying Engaged with Ap Bio Cellular Respiration Study Guide
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Ap Bio Cellular Respiration Study Guide
- 9. Balancing eBooks and Physical Books Ap Bio Cellular Respiration Study Guide
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Ap Bio Cellular Respiration Study Guide
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Ap Bio Cellular Respiration Study Guide
  - Setting Reading Goals Ap Bio Cellular Respiration Study Guide
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Ap Bio Cellular Respiration Study Guide
  - Fact-Checking eBook Content of Ap Bio Cellular Respiration Study Guide
  - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development
  - Exploring Educational eBooks

## 14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

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