

Unit 3 Ap Bio

Cheatography

AP Bio Unit 3: Cellular Energetics Cheat Sheet
by PrincessB303 via cheatography.com/122525/cs/22782/

Enzymes

Enzymes: biological catalysts that facilitate chemical rxns in cells by lowering the activation energy

Structure:

- Active site that specifically interacts with substrate molecules

- Shape and charge of the substrate must be compatible with the active site of the enzyme

Environmental Impacts:

Denaturation: protein structure is disrupted, eliminating the ability to catalyze rxns

- Environmental temperatures and pH outside the optimal range will cause structural changes

- a. pH change can alter H-bonds that provide enzyme structure

- b. H temp increases speed of molecules in a solution, increasing frequency of collisions between enzymes and substrates (increase rate of rxn)

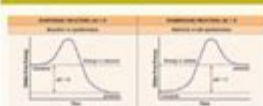
- Relative concentrations of substrates and products determine how efficient rxn is

Inhibitors:

- Competitive inhibitor molecules can bind reversibly or irreversibly to the active site of enzyme

- Noncompetitive inhibitors can bind allosteric sites, changing the activity of the enzyme

Endergonic vs. Exergonic



Thermodynamics

1st Nrg cannot be created nor destroyed
Law only transferred

2nd every nrg transfer increases entropy
Law (S) of universe; process must

increase entropy to be spontaneous

- Energy input must exceed energy loss to maintain order and to power cellular processes

- Cellular processes that release energy may be coupled with cellular processes that require energy

- a. Often sequential; product of rxn is reactant for next step

- Loss of order or energy flow results in death

- Living systems require constant nrg input

Cofactor vs. Coenzyme

Cofactor Inorganic; Cu, Zn, Mg, Fe, Ca ions; Remove electrons, protons or chemical groups from substrate

Coenzyme Organic (non-protein); NAD⁺, FAD⁺, vitamin complexes; Remove electrons from substrate and transfer to other molecules

Both aid in proper functioning of enzyme

Fitness

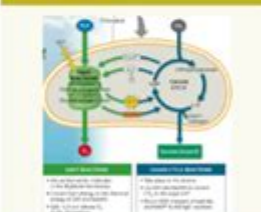
- Variation at the molecular level provides organisms with ability to respond to various environmental stimuli

- Variation in the number and types of molecules within cells provide organisms with greater ability to survive and/or reproduce in different environments

Cellular Respiration



Photosynthesis



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Page 1 of 1.

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Conquering AP Bio Unit 3: Cellular Energetics & Photosynthesis Mastery

Are you staring down the barrel of AP Biology Unit 3, feeling overwhelmed by cellular respiration and photosynthesis? Don't panic! This comprehensive guide breaks down everything you need to know to master this crucial unit, boosting your understanding and ultimately, your AP score. We'll cover key concepts, offer effective study strategies, and provide actionable tips to ensure you not

only survive but thrive in the world of cellular energetics. This isn't just another summary; it's your personalized roadmap to success in AP Bio Unit 3.

Understanding the Core Concepts of Unit 3 AP Bio

Unit 3 of AP Biology delves into the fascinating world of cellular energy, focusing primarily on two interconnected processes: cellular respiration and photosynthesis. These processes are fundamental to all life on Earth, and a deep understanding is critical for success in the course. Let's break them down:

Cellular Respiration: Harvesting Energy from Glucose

Cellular respiration is the process by which cells break down glucose to produce ATP (adenosine triphosphate), the cell's primary energy currency. This intricate process occurs in several stages:

Glycolysis: This initial stage occurs in the cytoplasm and doesn't require oxygen. It yields a small amount of ATP and NADH.

Pyruvate Oxidation: Pyruvate, the product of glycolysis, is transported to the mitochondria and converted into acetyl-CoA.

Krebs Cycle (Citric Acid Cycle): This cycle takes place in the mitochondrial matrix and generates ATP, NADH, FADH₂, and CO₂.

Oxidative Phosphorylation (Electron Transport Chain and Chemiosmosis): This final stage, located in the inner mitochondrial membrane, utilizes the electron carriers NADH and FADH₂ to generate a significant amount of ATP through chemiosmosis. This process relies on oxygen as the final electron acceptor.

Understanding the details of each stage, including the inputs, outputs, and locations within the cell, is paramount. Don't just memorize the steps; try to understand the chemical reactions and energy transformations involved.

Photosynthesis: Capturing Solar Energy

Photosynthesis is the process by which plants and other photosynthetic organisms convert light energy into chemical energy in the form of glucose. This process, the opposite of cellular respiration, occurs in two main stages:

Light-Dependent Reactions: These reactions take place in the thylakoid membranes of chloroplasts and involve the absorption of light energy, splitting water molecules (photolysis), and the generation of ATP and NADPH.

Light-Independent Reactions (Calvin Cycle): This cycle, occurring in the stroma of chloroplasts, uses the ATP and NADPH produced in the light-dependent reactions to convert CO₂ into glucose.

Grasping the intricate interplay between these two stages, including the roles of pigments like chlorophyll, is vital for a complete understanding of photosynthesis. Pay close attention to the flow of energy and electrons throughout the process.

Mastering Unit 3: Effective Study Strategies

Simply reading the textbook won't cut it. To truly master Unit 3, you need a multi-faceted approach:

Active Recall: Test yourself frequently using flashcards, practice questions, and diagrams. Don't just passively reread your notes.

Concept Mapping: Create visual representations of the processes to connect concepts and improve understanding.

Practice Problems: Work through numerous practice problems to solidify your understanding and identify areas where you need further review. The AP Biology exam heavily emphasizes application of knowledge.

Study Groups: Collaborating with classmates can be incredibly beneficial. Explaining concepts to others reinforces your own understanding.

Utilize Online Resources: Explore reputable online resources like Khan Academy, Crash Course Biology, and other educational websites for supplementary explanations and practice materials.

Beyond the Basics: Connecting Concepts

The key to success in Unit 3 lies in understanding the intricate connections between cellular respiration and photosynthesis. These processes are not isolated events but rather integrated parts of a larger system that sustains life on Earth. Focus on the following:

Energy Flow: Trace the flow of energy from sunlight to glucose to ATP throughout both processes.

Electron Carriers: Understand the roles of NADH and FADH₂ in cellular respiration and NADPH in photosynthesis.

Redox Reactions: Recognize the importance of oxidation and reduction reactions in both cellular respiration and photosynthesis.

Conclusion

Conquering AP Biology Unit 3 requires dedication and a strategic approach. By focusing on a strong understanding of the core concepts, employing effective study strategies, and recognizing the interconnectedness of cellular respiration and photosynthesis, you can significantly improve your chances of success on the AP exam. Remember, consistent effort and a deep understanding of the underlying principles will lead to mastery.

FAQs

1. What's the difference between aerobic and anaerobic respiration? Aerobic respiration requires oxygen as the final electron acceptor in the electron transport chain, producing a large amount of ATP. Anaerobic respiration doesn't require oxygen and produces less ATP.
2. How do plants use the glucose produced during photosynthesis? Plants use glucose as a source of energy for cellular respiration, as building blocks for cellulose and other organic molecules, and for storage as starch.
3. What are the factors that affect the rate of photosynthesis? Light intensity, carbon dioxide concentration, and temperature all influence the rate of photosynthesis.
4. How does chemiosmosis generate ATP? Chemiosmosis utilizes the proton gradient established across the inner mitochondrial membrane (or thylakoid membrane in photosynthesis) to drive ATP synthesis through ATP synthase.
5. What are the different types of fermentation? Common types include lactic acid fermentation (in muscle cells and some bacteria) and alcoholic fermentation (in yeast). Both occur in the absence of oxygen.

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Biology for AP® courses covers the scope and sequence requirements of a typical two-semester Advanced Placement® biology course. The text provides comprehensive coverage of foundational research and core biology concepts through an evolutionary lens. Biology for AP® Courses was designed to meet and exceed the requirements of the College Board's AP® Biology framework while allowing significant flexibility for instructors. Each section of the book includes an introduction based on the AP® curriculum and includes rich features that engage students in scientific practice and AP® test preparation; it also highlights careers and research opportunities in biological sciences.

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Understanding by Design offers teacher-designers a clear path to the creation of curriculum that ensures better learning and a more stimulating experience for students and teachers alike.

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unit 3 ap bio: Communities in Action National Academies of Sciences, Engineering, and Medicine, Health and Medicine Division, Board on Population Health and Public Health Practice, Committee on Community-Based Solutions to Promote Health Equity in the United States, 2017-04-27 In the United States, some populations suffer from far greater disparities in health than others. Those disparities are caused not only by fundamental differences in health status across segments of the population, but also because of inequities in factors that impact health status, so-called determinants of health. Only part of an individual's health status depends on his or her behavior and choice; community-wide problems like poverty, unemployment, poor education, inadequate housing, poor public transportation, interpersonal violence, and decaying neighborhoods also contribute to health inequities, as well as the historic and ongoing interplay of structures, policies, and norms that shape lives. When these factors are not optimal in a community, it does not mean they are intractable: such inequities can be mitigated by social policies that can shape health in powerful ways. Communities in Action: Pathways to Health Equity seeks to delineate the causes of and the solutions to health inequities in the United States. This report focuses on what communities can do to promote health equity, what actions are needed by the many and varied stakeholders that are part of communities or support them, as well as the root causes and structural barriers that need to be overcome.

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unit 3 ap bio: Sterling AP Biology Practice Questions Sterling Test Prep, 2014-04-10 AP Biology prep best seller! Guaranteed higher score or your money back! We've helped thousands of students improve their AP scores This AP Biology prep book contains over 1,500 Biology practice questions with detailed explanations and reflects the new AP Bio curriculum. This book will help you to: - master important biology concepts - assess your knowledge of different Biology topics - improve your test-taking skills - prepare for the AP Biology exam comprehensively and cost effectively AP Biology 1,500+ Practice Questions by Sterling Test Prep is comprised of all Biology topics tested on the AP Biology exam. Scoring well on the AP exam is important for your future placement credit for college biology and for admission into college of your choice. To achieve a high score, you need to

develop skills to properly apply the knowledge you have and quickly choose the correct answer. You must solve numerous practice questions that represent the style and content of the AP Bio questions. Understanding key science concepts is more valuable than memorizing terms. The explanations discuss why the answer is correct and – more importantly – why another answer that may have seemed correct is the wrong choice. These explanations include the foundations and details of important science topics needed to answer related questions on the AP Biology exam. By reading these explanations carefully and understanding how they apply to solving the question, you will learn important biology concepts and the relationships between them. This will prepare you for the test and will significantly improve your score. All the questions are prepared by our science editors that possess extensive credentials, are educated in top colleges and universities. Our editors are experts on teaching sciences, preparing students for standardized science tests and have coached thousands of undergraduate and graduate school applicants on admission strategies. Topics covered in this book: eukaryotic cell: structure and function; molecular biology of eukaryotes; cellular metabolism and enzymes; specialized cells and tissues; photosynthesis; evolution, natural selection, classification, diversity; populations, communities, conservation biology; animal behavior & evolution; DNA and protein synthesis; genetics; microbiology; plants: structure, function, reproduction; endocrine, nervous, circulatory, lymphatic, immune, digestive, excretory, muscle, skeletal systems, respiratory, skin, reproductive systems; development.

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unit 3 ap bio: *Campbell Biology in Focus* , 2013

unit 3 ap bio: *Hillbilly Elegy* J. D. Vance, 2016-06-28 NEW YORK TIMES BESTSELLER A riveting book.—The Wall Street Journal Essential reading.—David Brooks, New York Times From a former marine and Yale Law School graduate, a powerful account of growing up in a poor Rust Belt town that offers a broader, probing look at the struggles of America's white working class *Hillbilly Elegy* is a passionate and personal analysis of a culture in crisis—that of white working-class Americans. The decline of this group, a demographic of our country that has been slowly disintegrating over forty years, has been reported on with growing frequency and alarm, but has never before been written about as searingly from the inside. J. D. Vance tells the true story of what a social, regional, and class decline feels like when you were born with it hung around your neck. The Vance family story begins hopefully in postwar America. J. D.'s grandparents were "dirt poor and in love," and moved north from Kentucky's Appalachia region to Ohio in the hopes of escaping the dreadful poverty around them. They raised a middle-class family, and eventually their grandchild (the author) would graduate from Yale Law School, a conventional marker of their success in achieving generational upward mobility. But as the family saga of *Hillbilly Elegy* plays out, we learn that this is only the short, superficial version. Vance's grandparents, aunt, uncle, sister, and, most of all, his mother, struggled profoundly with the demands of their new middle-class life, and were never able to fully escape the legacy of abuse, alcoholism, poverty, and trauma so characteristic of their part of America. Vance piercingly shows how he himself still carries around the demons of their chaotic family history. A deeply moving memoir with its share of humor and vividly colorful figures, *Hillbilly Elegy* is the story of how upward mobility really feels. And it is an urgent and troubling meditation on the loss of the American dream for a large segment of this country.

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