

IB BIOLOGY PRACTICE EXAM (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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THE FULL VERSION STUDY GUIDE

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Introduction

Preparing for a certification exam can feel overwhelming, but with the right tools, it becomes an opportunity to build confidence, sharpen your skills, and move one step closer to your goals. At Examzify, we believe that effective exam preparation isn't just about memorization, it's about understanding the material, identifying knowledge gaps, and building the test-taking strategies that lead to success.

This guide was designed to help you do exactly that.

Whether you're preparing for a licensing exam, professional certification, or entry-level qualification, this book offers structured practice to reinforce key concepts. You'll find a wide range of multiple-choice questions, each followed by clear explanations to help you understand not just the right answer, but why it's correct.

The content in this guide is based on real-world exam objectives and aligned with the types of questions and topics commonly found on official tests. It's ideal for learners who want to:

- Practice answering questions under realistic conditions,
- Improve accuracy and speed,
- Review explanations to strengthen weak areas, and
- Approach the exam with greater confidence.

We recommend using this book not as a stand-alone study tool, but alongside other resources like flashcards, textbooks, or hands-on training. For best results, we recommend working through each question, reflecting on the explanation provided, and revisiting the topics that challenge you most.

Remember: successful test preparation isn't about getting every question right the first time, it's about learning from your mistakes and improving over time. Stay focused, trust the process, and know that every page you turn brings you closer to success.

Let's begin.

How to Use This Guide

This guide is designed to help you study more effectively and approach your exam with confidence. Whether you're reviewing for the first time or doing a final refresh, here's how to get the most out of your Examzify study guide:

1. Start with a Diagnostic Review

Skim through the questions to get a sense of what you know and what you need to focus on. Your goal is to identify knowledge gaps early.

2. Study in Short, Focused Sessions

Break your study time into manageable blocks (e.g. 30 – 45 minutes). Review a handful of questions, reflect on the explanations.

3. Learn from the Explanations

After answering a question, always read the explanation, even if you got it right. It reinforces key points, corrects misunderstandings, and teaches subtle distinctions between similar answers.

4. Track Your Progress

Use bookmarks or notes (if reading digitally) to mark difficult questions. Revisit these regularly and track improvements over time.

5. Simulate the Real Exam

Once you're comfortable, try taking a full set of questions without pausing. Set a timer and simulate test-day conditions to build confidence and time management skills.

6. Repeat and Review

Don't just study once, repetition builds retention. Re-attempt questions after a few days and revisit explanations to reinforce learning. Pair this guide with other Examzify tools like flashcards, and digital practice tests to strengthen your preparation across formats.

There's no single right way to study, but consistent, thoughtful effort always wins. Use this guide flexibly, adapt the tips above to fit your pace and learning style. You've got this!

Questions

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1. What are carbohydrates primarily composed of?

- A. Carbon, Hydrogen, and Oxygen
- B. Nitrogen, Oxygen, and Carbon
- C. Sulfur, Phosphorus, and Nitrogen
- D. Carbon, Hydrogen, and Nitrogen

2. What does osmolarity refer to?

- A. The ability of a solution to hold dissolved gases
- B. The total concentration of osmotically active solutes
- C. The speed at which particles diffuse across membranes
- D. The net movement of water across a semi-permeable membrane

3. What characterizes saturated fatty acids?

- A. Presence of double bonds in the carbon chain
- B. Presence of only single bonds in the carbon chain
- C. High solubility in water
- D. Presence of multiple functional groups

4. What does the term carrying capacity refer to?

- A. The minimum number of individuals required for a species' survival
- B. The total population of all species in an ecosystem
- C. The maximum number of individuals an environment can sustainably support
- D. The fluctuating population sizes of different species

5. How do enzymes function in biological reactions?

- A. By increasing the reaction time
- B. By lowering the activation energy
- C. By changing the products of the reaction
- D. By stabilizing reaction intermediates

6. Which process is critical for the formation of gametes?

- A. Mitosis
- B. Fertilization
- C. Meiosis
- D. Binary fission

7. What is the correct sequence of taxonomic ranks from broadest to most specific?

- A. Species, Genus, Family, Order, Class, Phylum, Kingdom
- B. Kingdom, Phylum, Class, Order, Family, Genus, Species
- C. Phylum, Kingdom, Class, Species, Genus, Family, Order
- D. Order, Class, Phylum, Family, Species, Genus, Kingdom

8. What is catabolism characterized by?

- A. Energy storage
- B. Hydrolysis of macromolecules into monomers
- C. Synthesis of protein chains
- D. Formation of carbohydrates

9. How do mutations affect protein synthesis?

- A. They can enhance the flavor of proteins
- B. They may lead to changes in the amino acid sequence
- C. They have no impact on protein structure
- D. They can only affect nucleic acid sequences

10. What is a change to DNA that can lead to new alleles called?

- A. Gene transfer
- B. Mutation
- C. Recombination
- D. Transcription

Answers

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1. A
2. B
3. B
4. C
5. B
6. C
7. B
8. B
9. B
10. B

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Explanations

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1. What are carbohydrates primarily composed of?

- A. Carbon, Hydrogen, and Oxygen**
- B. Nitrogen, Oxygen, and Carbon
- C. Sulfur, Phosphorus, and Nitrogen
- D. Carbon, Hydrogen, and Nitrogen

Carbohydrates are primarily composed of carbon, hydrogen, and oxygen atoms. These biomolecules follow a general formula of $(CH_2O)_n$, where 'n' can vary to indicate the number of repeating units of monosaccharides, the simplest form of carbohydrates. The structural arrangement of these atoms allows for the formation of simple sugars like glucose and more complex carbohydrates such as starch and cellulose. The presence of carbon is central to the framework of carbohydrates, while hydrogen and oxygen are essential for forming the hydroxyl (-OH) groups that contribute to the solubility and reactivity of these molecules. The unique ratio of these elements distinguishes carbohydrates from other macromolecules, such as proteins or nucleic acids, which have different elemental compositions. Understanding that carbohydrates are primarily made up of these three elements is fundamental in studying their role in biology, particularly in energy storage and structural functions in living organisms.

2. What does osmolarity refer to?

- A. The ability of a solution to hold dissolved gases
- B. The total concentration of osmotically active solutes**
- C. The speed at which particles diffuse across membranes
- D. The net movement of water across a semi-permeable membrane

Osmolarity refers to the total concentration of osmotically active solutes in a solution, which includes all particles that can contribute to osmotic pressure, such as ions and small molecules. This measurement is crucial in various biological processes because it helps determine how solutions affect cell volume and water movement. When a cell is placed in a solution with a certain osmolarity, it will influence the direction and extent of osmosis, as water moves from areas of lower solute concentration to areas of higher solute concentration to achieve equilibrium. Understanding osmolarity is important in physiological contexts, such as hydration and balancing electrolytes in cells. The presence of different solutes will determine whether a solution is isotonic, hypertonic, or hypotonic relative to the cell's internal environment, impacting cellular processes and overall homeostasis. The others do not accurately define osmolarity, focusing instead on specifics of gas solubility, diffusion rates, or water movement, rather than the overall concentration of solutes that dictate osmotic behavior.

3. What characterizes saturated fatty acids?

- A. Presence of double bonds in the carbon chain
- B. Presence of only single bonds in the carbon chain**
- C. High solubility in water
- D. Presence of multiple functional groups

Saturated fatty acids are specifically characterized by the presence of only single bonds between the carbon atoms in their fatty acid chains. This means that each carbon atom in the chain is 'saturated' with hydrogen atoms, as there are no double bonds present to reduce the number of hydrogen atoms attached. This structure has implications for the physical properties of saturated fatty acids, such as their solidity at room temperature, which contrasts with unsaturated fatty acids that contain double bonds and are often liquid. The lack of double bonds allows saturated fatty acids to pack closely together, contributing to their higher melting points compared to unsaturated fatty acids. In contrast, the presence of double bonds would indicate that the fatty acid is unsaturated, not saturated. Saturated fatty acids are also not particularly soluble in water, as they are hydrophobic due to their long hydrocarbon chains. Additionally, while many fatty acids can have functional groups, the defining characteristic of saturated fatty acids specifically relates to the bonding structure of the carbon chain, not the diversity of functional groups present.

4. What does the term carrying capacity refer to?

- A. The minimum number of individuals required for a species' survival
- B. The total population of all species in an ecosystem
- C. The maximum number of individuals an environment can sustainably support**
- D. The fluctuating population sizes of different species

Carrying capacity refers to the maximum number of individuals of a particular species that an environment can sustainably support over time without causing long-term damage to the ecosystem. This concept is important in ecology because it helps to understand population dynamics and the limits of resource availability, such as food, water, and habitat space. When a population exceeds its carrying capacity, it can lead to resource depletion, environmental degradation, and ultimately a decline in population due to increased competition, starvation, or disease. Therefore, understanding carrying capacity is crucial for conservation efforts and managing wildlife populations sustainably.

5. How do enzymes function in biological reactions?

- A. By increasing the reaction time
- B. By lowering the activation energy**
- C. By changing the products of the reaction
- D. By stabilizing reaction intermediates

Enzymes play a crucial role in facilitating biological reactions by lowering the activation energy required for those reactions to occur. Activation energy is the minimum energy needed for reactants to convert into products in a chemical reaction. By decreasing this energy barrier, enzymes enhance the speed of reactions without being consumed in the process. The reduction in activation energy allows reactions to proceed more readily at lower temperatures, which is particularly important in biological systems where extreme temperatures might not be favorable for organism function. Furthermore, enzymes work by providing an active site that binds substrates with high specificity, allowing the conversion of substrates into products more efficiently. In summary, lowering the activation energy is fundamental to how enzymes accelerate biochemical reactions, making them vital to processes such as metabolism, digestion, and cellular signaling.

6. Which process is critical for the formation of gametes?

- A. Mitosis
- B. Fertilization
- C. Meiosis**
- D. Binary fission

Meiosis is the process that is critical for the formation of gametes, which are the reproductive cells (sperm and eggs in animals). This specialized form of cell division reduces the chromosome number by half, resulting in four non-identical daughter cells, each with a single set of chromosomes. This is essential for sexual reproduction, as it ensures that when gametes fuse during fertilization, the resulting zygote has the correct diploid chromosome number. By generating genetic diversity through processes such as crossing over and independent assortment, meiosis contributes to the variation seen in offspring, which can enhance survival and adaptation. The unique characteristics of gametes formed through meiosis, in contrast to somatic cells produced by mitosis, are foundational for sexual reproduction.

7. What is the correct sequence of taxonomic ranks from broadest to most specific?

- A. Species, Genus, Family, Order, Class, Phylum, Kingdom
- B. Kingdom, Phylum, Class, Order, Family, Genus, Species**
- C. Phylum, Kingdom, Class, Species, Genus, Family, Order
- D. Order, Class, Phylum, Family, Species, Genus, Kingdom

The sequence of taxonomic ranks from the broadest to the most specific is indeed: Kingdom, Phylum, Class, Order, Family, Genus, Species. This classification system, known as the Linnaean taxonomy, organizes the diversity of life into hierarchical categories, where each rank becomes increasingly specific as you move down the list. Starting with the Kingdom, which encompasses the largest groups of organisms, it includes multiple Phyla. Each Phylum is then divided into Classes, which are further subdivided into Orders. Each Order contains several Families, which group related Genera (plural of Genus) together. Finally, the most specific level, Species, refers to individual organisms capable of interbreeding and producing fertile offspring. This hierarchical structure not only helps in organizing biological diversity but also provides insight into evolutionary relationships among organisms. Each rank represents a set of shared characteristics, making taxonomy a critical tool in biology for classification and understanding the biological world.

8. What is catabolism characterized by?

- A. Energy storage
- B. Hydrolysis of macromolecules into monomers**
- C. Synthesis of protein chains
- D. Formation of carbohydrates

Catabolism is characterized by the breakdown of larger molecules into smaller units, which is a crucial process for energy production in living organisms. Specifically, this involves the hydrolysis of macromolecules, such as proteins, carbohydrates, and lipids, into their respective monomers, which can then be used for various metabolic processes or further catabolized for energy. For example, proteins are broken down into amino acids, carbohydrates into monosaccharides, and fats into fatty acids and glycerol. This breakdown releases energy that the cell can harness to fuel its functions, making the process pivotal for maintaining life and facilitating metabolism. Therefore, the hydrolysis of macromolecules into monomers effectively encapsulates the essence of catabolic processes, as it highlights both the degradation of larger structures and the release of energy required for the organism's activities.

9. How do mutations affect protein synthesis?

- A. They can enhance the flavor of proteins
- B. They may lead to changes in the amino acid sequence**
- C. They have no impact on protein structure
- D. They can only affect nucleic acid sequences

Mutations can significantly impact protein synthesis, and one of the primary ways they do this is by causing changes in the amino acid sequence of the resulting proteins. A mutation refers to a permanent alteration in the DNA sequence that can influence how a gene is expressed. When a mutation occurs in a gene coding for a protein, it can alter the sequence of nucleotides, which may lead to a different sequence of amino acids during translation. This change in the amino acid sequence can have various effects on the protein's structure and function. For instance, the alteration could result in a nonfunctional protein, a protein with enhanced function, or a protein that functions differently than intended. The specific impact depends on the nature of the mutation and where it occurs within the gene. While there are other choices to consider, they either suggest incorrect effects of mutations on protein synthesis or misinterpret the relationship between mutations and protein structure. Understanding the connection between mutations and changes in amino acid sequences highlights the fundamental role that genetics plays in protein synthesis and the biological diversity that arises from these changes.

10. What is a change to DNA that can lead to new alleles called?

- A. Gene transfer
- B. Mutation**
- C. Recombination
- D. Transcription

A change to DNA that can lead to new alleles is referred to as a mutation. Mutations are alterations in the nucleotide sequence of the DNA, which can occur due to various factors such as errors during DNA replication, exposure to radiation, or chemical agents. When mutations affect the coding regions of genes, they can lead to changes in the protein that the gene encodes, potentially resulting in new traits that contribute to genetic variation within a population. This genetic variation is crucial for evolution, as it provides the raw material for natural selection. The introduction of new alleles through mutations can affect an organism's phenotype and influence its adaptability to environmental changes. In contrast, gene transfer involves the movement of genetic material between organisms, recombination refers to the mixing of genetic material during sexual reproduction, and transcription is the process of converting DNA into RNA, none of which directly result in the creation of new alleles.

Next Steps

Congratulations on reaching the final section of this guide. You've taken a meaningful step toward passing your certification exam and advancing your career.

As you continue preparing, remember that consistent practice, review, and self-reflection are key to success. Make time to revisit difficult topics, simulate exam conditions, and track your progress along the way.

If you need help, have suggestions, or want to share feedback, we'd love to hear from you. Reach out to our team at hello@examzify.com.

Or visit your dedicated course page for more study tools and resources:

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We wish you the very best on your exam journey. You've got this!

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