IB BIOLOGY PRACTICE EXAM (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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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.

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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!

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Questions

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1. What distinguishes prokaryotic cells from eukaryotic cells?

A. Prokaryotic cells have a nucleus
B. Prokaryotic cells do not have membrane-bound organelles
C. Eukaryotic cells lack a cell membrane
D. Prokaryotic cells are always multicellular

2. Why is DNA replication important?

A. It allows for genetic variation
B. It ensures new cells have identical DNA
C. It repairs damaged DNA
D. It facilitates protein synthesis

3. Genetic drift is most significant in which type of population?

A. A large, stable population
B. A population subjected to strong selective pressure
C. A small, isolated population
D. A population with high gene flow

4. What is the primary function of the cell membrane?

A. Storage of genetic information
B. Regulating what enters and leaves the cell
C. Energy production through respiration
D. Protein synthesis

5. Speciation occurs when:

A. Two populations are reproductively isolated from one another
B. A species goes extinct in an environment
C. Species evolve the same traits in different environments
D. An organism adapts to a new environment

6. What taxa is categorized as the lowest level in biological classification?

A. Genus
B. Species
C. Order
D. Family

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7. Diploid nuclei contain:

A. One chromosome of each pair
B. A single homologous chromosome
C. Pairs of homologous chromosomes
D. Only haploid chromosomes

8. What are adaptations in an ecological context?

A. Behaviors that increase survival without altering physical forms
B. The ways organisms are shaped to enhance their survival and reproduction
C. Changes that occur only at the genetic level
D. Random changes in an organism during its lifetime

9. Which cyclin helps in the transition from the G1 phase to the S phase?

A. Cyclin D
B. Cyclin B
C. Cyclin E
D. Cyclin A

10. What defines a mutualistic relationship in symbiosis?

A. One species benefits while the other is harmed
B. Both species benefit from the relationship
C. One species is unaffected while the other benefits
D. Both species are negatively impacted

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Answers

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

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Explanations

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1. What distinguishes prokaryotic cells from eukaryotic cells?

A. Prokaryotic cells have a nucleus

B. Prokaryotic cells do not have membrane-bound organelles

C. Eukaryotic cells lack a cell membrane

D. Prokaryotic cells are always multicellular

Prokaryotic cells are characterized by their lack of membrane-bound organelles, which sets them apart from eukaryotic cells. In prokaryotes, the genetic material is not enclosed within a membrane-bound nucleus; instead, it resides in a region called the nucleoid. While eukaryotic cells possess various organelles, such as the nucleus, mitochondria, and endoplasmic reticulum, prokaryotic cells rely on simpler structures. This absence of specialized compartments allows prokaryotic cells to thrive in diverse environments but also limits some of their metabolic capabilities compared to eukaryotic cells, which are more complex and compartmentalized. The other options present incorrect notions about prokaryotic and eukaryotic cells, focusing on misconceptions regarding their structures. For instance, prokaryotic cells do not have a nucleus, and the claim that eukaryotic cells lack a cell membrane is fundamental to all cellular life, which isn't true. Additionally, saying that prokaryotic cells are always multicellular is inaccurate, as prokaryotic organisms are typically unicellular.

2. Why is DNA replication important?

A. It allows for genetic variation

B. It ensures new cells have identical DNA

C. It repairs damaged DNA

D. It facilitates protein synthesis

DNA replication is crucial for the process of cell division, as it ensures that each new cell receives an exact copy of the parent cell's DNA. This is essential for maintaining genetic continuity across generations of cells. When a cell divides, whether through mitosis or meiosis, the replicated DNA is distributed so that each daughter cell inherits the same genetic information as the original cell. This fidelity in genetic material is vital for the proper functioning and growth of organisms, allowing them to maintain stable inheritance of traits. While options like genetic variation, DNA repair, and protein synthesis are important biological processes, they are not the primary focus of DNA replication. Genetic variation typically arises from processes like mutation and recombination, DNA repair mechanisms act to fix damaged DNA rather than facilitate replication, and protein synthesis occurs after replication has taken place and is dependent on the information encoded within the replicated DNA. Thus, the main role of DNA replication is to ensure that each new cell retains a complete and identical set of genetic instructions.

3. Genetic drift is most significant in which type of population?

A. A large, stable population

B. A population subjected to strong selective pressure

C. A small, isolated population

D. A population with high gene flow

Genetic drift refers to the random fluctuations in allele frequencies that can lead to significant changes within a population, particularly affecting smaller populations. In a small, isolated population, the effects of genetic drift become pronounced because there are fewer individuals to contribute genetic variability. This limited genetic pool means that random events—such as the loss of individuals due to chance—can lead to large shifts in the population's genetic structure. In small populations, certain alleles may become fixed (reach a frequency of 100%) or lost (reach a frequency of 0%) due to these random sampling effects. Therefore, genetic drift can lead to rapid changes in allele frequencies and greater divergence from other populations. This phenomenon can result in decreased genetic diversity, making the population more vulnerable to environmental changes and diseases, further emphasizing the significance of genetic drift in small, isolated settings.

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4. What is the primary function of the cell membrane?

A. Storage of genetic information

B. Regulating what enters and leaves the cell

C. Energy production through respiration

D. Protein synthesis

The primary function of the cell membrane is to regulate what enters and leaves the cell, making it vital for maintaining the cell's internal environment and overall homeostasis. The cell membrane is selectively permeable, which means it controls the movement of substances in and out of the cell based on size, polarity, and concentration gradients. This regulation allows the cell to take in essential nutrients, expel waste products, and maintain a stable concentration of ions and molecules, which is crucial for various cellular processes. The structure of the cell membrane, primarily composed of a phospholipid bilayer embedded with proteins, facilitates this selective permeability. The proteins can function as channels or transporters that assist in the movement of specific substances across the membrane, while the lipid bilayer acts as a barrier to most water-soluble substances. In contrast, the other options refer to separate functions that are not directly associated with the cell membrane. The storage of genetic information pertains to the nucleus, energy production is primarily associated with mitochondria, and protein synthesis occurs in ribosomes. These functions are essential for cellular activities but do not define the cell membrane's primary role.

5. Speciation occurs when:

A. Two populations are reproductively isolated from one another

B. A species goes extinct in an environment

C. Species evolve the same traits in different environments

D. An organism adapts to a new environment

Speciation is the evolutionary process through which new biological species arise. This process is primarily driven by the reproductive isolation of populations, which means that two populations are unable to interbreed and produce fertile offspring. When populations are reproductively isolated, they can diverge genetically over time, leading to the development of distinct species. This isolation can occur due to various factors, including geographical barriers, behavioral differences, or temporal variations in mating behaviors. In contrast, while extinction and adaptation to new environments are significant ecological processes, they do not directly lead to the formation of new species on their own. Similarly, while convergent evolution—where different species independently evolve similar traits in response to similar environmental challenges—does occur, it does not result in the creation of new species. Therefore, the essential mechanism behind the emergence of new species is indeed the reproductive isolation of two populations.

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6. What taxa is categorized as the lowest level in biological classification?

A. Genus

B. Species

C. Order

D. Family

The lowest level in biological classification is the species. This classification is fundamental in the hierarchy of taxonomy, which organizes living organisms into increasingly specific categories. The species represents a group of organisms that can interbreed and produce fertile offspring, sharing common characteristics and genetic makeup. This classification is crucial for identifying and studying biodiversity, as each species is unique and can be distinguished from others by its traits, behavior, and ecological role. Understanding species helps in conservation efforts and ecosystem management, as it allows scientists to focus on specific groups of organisms that may require protection or further study. In contrast, the other levels in the classification hierarchy, such as genus, family, and order, encompass broader groups that include multiple species sharing common traits but are not as specific as the species level.

7. Diploid nuclei contain:

A. One chromosome of each pair

B. A single homologous chromosome

C. Pairs of homologous chromosomes

D. Only haploid chromosomes

Diploid nuclei contain pairs of homologous chromosomes, which is a defining characteristic of diploid organisms. Each homologous pair consists of one chromosome inherited from each parent, leading to a complete set of chromosomes. In humans, for instance, the diploid number is 46, composed of 23 pairs of chromosomes. Each of these pairs contains chromosomes that have the same genes but may have different alleles, allowing for genetic diversity. This structure is essential for processes such as meiosis, where homologous chromosomes separate into gametes, preserving genetic variation while ensuring that each gamete receives one complete set of chromosomes. The presence of homologous pairs in diploid nuclei is crucial for sexual reproduction and the formation of offspring with traits inherited from both parents.

8. What are adaptations in an ecological context?

A. Behaviors that increase survival without altering physical forms

B. The ways organisms are shaped to enhance their survival and reproduction

C. Changes that occur only at the genetic level

D. Random changes in an organism during its lifetime

Adaptations in an ecological context refer to the various traits that have evolved in organisms that enhance their ability to survive and reproduce in their specific environments. This encompasses both physical characteristics and behavioral traits that allow organisms to effectively interact with their surroundings, avoid predators, find food, and reproduce successfully. These traits have typically been shaped through the process of natural selection, where individuals with advantageous adaptations are more likely to survive and pass on those traits to their offspring. For instance, the long neck of a giraffe is an adaptation that allows it to reach leaves high up in trees, making it more successful in its feeding strategy compared to other animals. While behaviors that increase survival without altering physical forms could be part of an organism's adaptation, they do not encompass the broader definition which includes physical adaptations as well. Furthermore, adaptations are not limited to genetic changes; they can include changes that manifest in response to environmental pressures over time, not just changes that occur at the genetic level alone. Random changes in an organism during its lifetime do not typically result in adaptations, as they are not directed by natural selection and do not enhance survival or reproductive success.

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9. Which cyclin helps in the transition from the G1 phase to the S phase?

A. Cyclin D

B. Cyclin B

C. Cyclin E

D. Cyclin A

The transition from the G1 phase to the S phase of the cell cycle is a critical point where cells prepare to replicate their DNA. Cyclin D is primarily responsible for driving this transition. It activates Cyclin-dependent kinases (CDKs), specifically CDK4 and CDK6, which together promote the progression into the S phase by phosphorylating target proteins that enable the cell to move from a state of growth to one of DNA synthesis. During the G1 phase, Cyclin D levels rise in response to external growth signals, and as it binds to its respective CDK, it initiates a cascade of events that facilitate cell cycle progression. This preparation includes the transcription of genes required for DNA replication and the formation of necessary molecular machinery for the S phase. In contrast, Cyclin E, which is also involved in the transition to the S phase, acts later and works in conjunction with CDK2 to further push the cell toward DNA replication. While Cyclin A and Cyclin B are crucial for other phases of the cell cycle, particularly for the S phase and mitosis respectively, they do not play the primary role in the G1 to S phase transition like Cyclin D does. Hence, the focus on Cyclin D as

10. What defines a mutualistic relationship in symbiosis?

A. One species benefits while the other is harmed

B. Both species benefit from the relationship

C. One species is unaffected while the other benefits

D. Both species are negatively impacted

A mutualistic relationship in symbiosis is characterized by a situation where both species involved benefit from their interaction. This type of relationship promotes greater survival, reproduction, or overall fitness for both organisms, creating a win-win scenario. For example, consider the relationship between bees and flowering plants. Bees collect nectar for food while simultaneously aiding in the pollination of the plants, thus allowing them to reproduce. This mutual benefit drives the success of both organisms. In contrast, other symbiotic relationships may not yield the same benefits for both parties. For example, in parasitism, one organism benefits at the expense of the other, while commensalism involves one species benefiting without significantly impacting the other. These distinctions highlight the unique nature of mutualism in fostering cooperative interactions between species.

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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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