

HONORS BIOLOGY (HBIO) EVOLUTION 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.

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. How do ecological niches contribute to speciation and adaptive radiation?

- A. They increase gene flow between populations.
- B. They reduce competition and promote divergent selection.
- C. They prevent colonization of new habitats.
- D. They enforce identical resource use among species.

2. What defines a clade?

- A. A group with a common ancestor but not all descendants.
- B. A population of identical individuals.
- C. A geographic region containing multiple species.
- D. A group consisting of a common ancestor and all its descendants.

3. Which type of natural selection favors individuals at the center of a distribution curve, reducing variation?

- A. Directional Selection
- B. Stabilizing Selection
- C. Disruptive Selection
- D. Sexual Selection

4. What is phylogenetics?

- A. The study of the origin of life.
- B. The study of evolutionary relationships among organisms using data such as morphology, DNA sequences, and fossils.
- C. The distribution of ecosystems.
- D. The genetics of single genes only.

5. Which statement describes an analogous trait?

- A. A trait that arises independently in different lineages due to similar selective pressures.
- B. A trait inherited from a common ancestor and retained across descendants.
- C. A trait present only in a fossil lineage but not in descendants.
- D. A trait that is never used for the organism's function.

- 6. Remains of once living organisms show change over time.**
- A. Speciation
 - B. Fossil evidence
 - C. Vestigial organs
 - D. Embryology evidence
- 7. Which organelles contain their own circular DNA and are cited as evidence for endosymbiotic theory?**
- A. Nucleus and endoplasmic reticulum
 - B. Mitochondria and chloroplasts
 - C. Lysosomes and peroxisomes
 - D. Golgi apparatus and vesicles
- 8. In the context of postzygotic isolation, which term describes reduced fertility of hybrid individuals?**
- A. Phylogeny
 - B. Reduced Hybrid Fertility
 - C. Hybrid Breakdown
 - D. Reduced Hybrid Viability
- 9. How does antibiotic resistance illustrate natural selection in bacteria?**
- A. Antibiotics cause universal survival.
 - B. Exposure kills susceptible, allowing resistant variants to survive and increase in frequency.
 - C. Resistance arises only through horizontal gene transfer.
 - D. Resistance can occur through random mutation and selection.
- 10. Which term best defines a well-supported, testable explanation of phenomena in the natural world?**
- A. Theory
 - B. Evolution
 - C. Charles Darwin
 - D. Fossil

Answers

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

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Explanations

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1. How do ecological niches contribute to speciation and adaptive radiation?

- A. They increase gene flow between populations.
- B. They reduce competition and promote divergent selection.**
- C. They prevent colonization of new habitats.
- D. They enforce identical resource use among species.

Ecological niches shape the selective pressures populations face. When related populations exploit different resources or occupy different habitats, they experience divergent selection: traits that improve performance in one niche become more common in that group, while different traits rise in the other. This reduces direct competition between groups because they're using different parts of the environment, so each population can specialize further. Over time, these differences can lead to reproductive isolation—whether through changes in mating timing, cues, or preferences linked to the distinct niches—so the groups no longer interbreed. That combination of divergence and isolation is how speciation arises. Adaptive radiation fits this idea neatly: when a lineage colonizes a new area with many unoccupied niches, natural selection drives rapid diversification as different populations adapt to distinct resources, leading to a burst of new species filling those niches. Darwin's finches and various lake-dwelling cichlids are classic examples of this pattern. Why the other ideas don't fit as well: increasing gene flow between populations would counteract divergence and hinder speciation; niches actually help populations colonize new environments by providing opportunities to exploit different resources rather than preventing it; and forcing identical resource use would heighten competition and blur the distinctions that drive divergence.

2. What defines a clade?

- A. A group with a common ancestor but not all descendants.
- B. A population of identical individuals.
- C. A geographic region containing multiple species.
- D. A group consisting of a common ancestor and all its descendants.**

A clade is a group that includes a common ancestor and all of its descendants, forming a complete branch on the evolutionary tree. This means the group is monophyletic, with nothing left out that shares that ancestor. The option that describes this exactly is the best answer. If you include the ancestor but leave out some descendants, you're describing a paraphyletic group, which isn't a clade. A population of identical individuals isn't about ancestral relationships, and a geographic region with multiple species is about location rather than lineage, so neither fits the idea of a clade.

3. Which type of natural selection favors individuals at the center of a distribution curve, reducing variation?

- A. Directional Selection
- B. Stabilizing Selection**
- C. Disruptive Selection
- D. Sexual Selection

Stabilizing selection favors intermediate phenotypes, because individuals with average traits have higher fitness in a stable environment. This means extremes are selected against, the mean stays about the same, and variation decreases as the population concentrates around the center of the distribution. An example is human infant birth weight: babies who are too small or too large face higher health risks, so mid-range weights are favored and variation in birth weight narrows over generations. In contrast, directional selection shifts the mean toward one extreme, disrupting stability of the center; disruptive selection increases variation by favoring both extremes; and sexual selection shapes traits related to mating success rather than centering on the mean.

4. What is phylogenetics?

- A. The study of the origin of life.
- B. The study of evolutionary relationships among organisms using data such as morphology, DNA sequences, and fossils.**
- C. The distribution of ecosystems.
- D. The genetics of single genes only.

Phylogenetics is the study of evolutionary relationships among organisms, inferred from evidence such as morphological traits, DNA sequences, and fossil data. By comparing similarities and differences across species, scientists construct phylogenetic trees that reflect how species are related through common ancestry and how lineages split over time. Morphology shows shared physical features, genetics reveal how closely related organisms are at the DNA level, and fossils provide time context and transitional forms that help anchor the history of life. This approach synthesizes multiple kinds of data to map the relationships among many organisms, rather than focusing on the origin of life, where organisms live today, or the behavior of single genes in isolation.

5. Which statement describes an analogous trait?

- A. A trait that arises independently in different lineages due to similar selective pressures.
- B. A trait inherited from a common ancestor and retained across descendants.**
- C. A trait present only in a fossil lineage but not in descendants.
- D. A trait that is never used for the organism's function.

Analogous traits come from convergent evolution: different species facing similar environmental challenges evolve features that look alike and serve similar functions, but these traits do not come from a recent common ancestor. The statement that fits this idea is that the trait arises independently in separate lineages due to similar selective pressures. For example, wings used for flight in insects and in birds evolved separately from different starting structures, yet both enable flight. By contrast, traits that are inherited from a common ancestor and kept across descendants are homologous, such as the same basic forelimb bone pattern found in humans, cats, whales, and bats. So the best description of an analogous trait is independent origin in response to similar selective pressures.

6. Remains of once living organisms show change over time.

- A. Speciation
- B. Fossil evidence**
- C. Vestigial organs
- D. Embryology evidence

Fossil evidence shows how life has changed over time by providing a record of organisms preserved in rocks from different ages. The sequence of fossils in older to younger layers reveals patterns of descent with modification, including transitional forms that share features with both ancestral and descendant groups. Dating these fossils places them on a timeline, illustrating gradual changes and the emergence of new traits over vast periods. This directly captures the idea of remains documenting evolutionary change. Other options point to related evidence for evolution—vestigial organs reveal remnants of past functions, embryology shows developmental similarities, and speciation describes how new species arise—but they don't alone convey the preserved timeline of life's history as clearly as the fossil record.

7. Which organelles contain their own circular DNA and are cited as evidence for endosymbiotic theory?

- A. Nucleus and endoplasmic reticulum
- B. Mitochondria and chloroplasts**
- C. Lysosomes and peroxisomes
- D. Golgi apparatus and vesicles

Organelles with their own circular DNA point to an ancient, bacterial-like origin. Mitochondria and chloroplasts each house a small circular genome separate from the cell's nuclear DNA, mirroring bacterial genomes. This fits the endosymbiotic theory, which proposes these organelles began as free-living bacteria that were engulfed by an ancestral eukaryotic cell and eventually formed a symbiotic relationship. In addition to their circular DNA, these organelles also have ribosomes similar to bacterial ribosomes and replicate by binary fission, reinforcing their prokaryotic ancestry. Other cellular components lack independent circular genomes, so they don't provide the same lines of evidence.

8. In the context of postzygotic isolation, which term describes reduced fertility of hybrid individuals?

- A. Phylogeny
- B. Reduced Hybrid Fertility**
- C. Hybrid Breakdown
- D. Reduced Hybrid Viability

Postzygotic isolation includes cases where hybrids survive but have trouble reproducing. When hybrids reach adulthood but can't produce offspring effectively, that is described as reduced hybrid fertility. This happens because chromosome differences between the parent species can interfere with meiosis, making it hard for hybrids to form viable gametes—mules are a classic example of this. Other terms describe different outcomes: reduced hybrid viability refers to hybrids that don't survive well, and hybrid breakdown describes hybrids that are viable and often fertile in the first generation but show reduced fitness in later generations. Phylogeny is about evolutionary relationships, not the fertility of hybrids. So the term that matches reduced fertility of hybrid individuals is reduced hybrid fertility.

9. How does antibiotic resistance illustrate natural selection in bacteria?

- A. Antibiotics cause universal survival.
- B. Exposure kills susceptible, allowing resistant variants to survive and increase in frequency.**
- C. Resistance arises only through horizontal gene transfer.
- D. Resistance can occur through random mutation and selection.

Antibiotics create a strong selective pressure on a bacterial population. Within that population there is variation in susceptibility—some bacteria carry resistance traits either by mutation or by acquiring resistance genes. When the antibiotic is present, the susceptible bacteria die or are inhibited, while the resistant ones survive and continue to reproduce. Their offspring inherit the resistance, so the trait becomes more common over generations. This shift in allele frequencies toward resistance is exactly how natural selection operates in action. While resistance can arise through mutation or gene transfer, the key point is that the antibiotic environment favors those with resistance, leading to an increasing proportion of resistant bacteria.

10. Which term best defines a well-supported, testable explanation of phenomena in the natural world?

A. Theory

B. Evolution

C. Charles Darwin

D. Fossil

In science, a theory is a well-supported, testable explanation of natural phenomena. It rests on a large body of evidence gathered from observations and experiments, and it can be used to make predictions about new situations. A theory isn't a guess; it's a coherent framework that integrates many tested ideas and can be revised as new data emerge. Because it explains a wide range of observations and remains testable, a theory stands up to scrutiny across many studies. This matches the description given. The other terms don't fit: a fossil is a physical remnant, a person's name refers to who proposed ideas, and evolution is a specific theory about how biological change occurs, not a general definition.

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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:

<https://hbioevolution.examzify.com>

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

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