

ARIZONA STATE UNIVERSITY (ASU) BIO345 EVOLUTION EXAM 1 PRACTICE (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. A beneficial allele is introduced into a bird subpopulation but fails to increase in frequency. What is likely preventing this increase?**
 - A. Local selection outweighs gene flow
 - B. Local selection and gene flow are equally influential
 - C. Gene flow from migration prevents local adaptation
 - D. Random chance enhances local adaptation
- 2. Which evolutionary mechanism is most likely to introduce new alleles into a population?**
 - A. Genetic drift
 - B. Mutation
 - C. Natural selection
 - D. Gene flow
- 3. To evaluate if beetle color is subject to natural selection, which experiment would best assess survival rates?**
 - A. Testing the heritability of color
 - B. Measuring the overall population size
 - C. Assessing reproductive advantages of color
 - D. Testing which colors survive to maturity
- 4. What effect does gene flow generally have on populations?**
 - A. Increases genetic diversity
 - B. Reduces genetic diversity
 - C. Strengthens selection pressure
 - D. Has no effect on allele frequencies
- 5. Which of the following is NOT considered a primary mechanism of evolution?**
 - A. Natural selection
 - B. Genetic drift
 - C. Cloning
 - D. Mutations

- 6. What does disruptive selection favor in a population?**
- A. Intermediate phenotypes
 - B. Extreme phenotypes
 - C. Uniform phenotypes
 - D. Stable phenotypes
- 7. Homologous structures are characterized by what key feature?**
- A. Identical function across different species
 - B. Similar anatomical features from a common ancestry
 - C. Complete morphological differences among species
 - D. Only existing in vertebrates
- 8. How does polygenic inheritance contribute to evolution?**
- A. By reducing the number of contributing genes to a trait
 - B. By creating continuous variation that can be acted upon by natural selection
 - C. By limiting genetic diversity in a population
 - D. By promoting isolated traits within a species
- 9. In which situation will gene swamping prevent local adaptation?**
- A. Selection is strong and migration is low
 - B. Gene flow is high and selection is weak
 - C. Selection and migration are both very high in magnitude
 - D. Selection and migration are both very low in magnitude
- 10. Which type of allele leads to wet earwax in humans?**
- A. W allele
 - B. w allele
 - C. Dominant allele
 - D. Recessive allele

Answers

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

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Explanations

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1. A beneficial allele is introduced into a bird subpopulation but fails to increase in frequency. What is likely preventing this increase?

- A. Local selection outweighs gene flow
- B. Local selection and gene flow are equally influential
- C. Gene flow from migration prevents local adaptation**
- D. Random chance enhances local adaptation

The scenario describes a situation where a beneficial allele is introduced but does not increase in frequency within the bird subpopulation. Gene flow, which is the transfer of genetic material between populations, can play a critical role in the evolutionary dynamics of subpopulations. When gene flow from other populations brings in alleles that are not beneficial in the specific local context, it can dilute the effect of beneficial alleles that have been introduced. In this case, if migrants from another population possess alleles that are more advantageous in the new environment, the advantageous allele may struggle to increase in frequency because the genetic contributions from these migrants can overwhelm the local adaptive potential of the beneficial allele. Thus, it is the gene flow from migration that is likely preventing the beneficial allele from increasing in the subpopulation, as new individuals may carry alleles that are either neutral or disadvantageous, obstructing the local adaptation process. This highlights the importance of understanding the balance between local selection pressures and the effects of gene flow in shaping population genetics and evolutionary trajectories.

2. Which evolutionary mechanism is most likely to introduce new alleles into a population?

- A. Genetic drift
- B. Mutation**
- C. Natural selection
- D. Gene flow

The introduction of new alleles into a population is primarily achieved through the process of mutation. Mutations are random changes in the genetic material of an organism, which can occur due to various factors such as environmental influences, errors during DNA replication, or through exposure to certain chemicals. These changes can lead to the creation of new alleles, which can then be inherited by subsequent generations if they occur in the germline (the reproductive cells). Mutations play a critical role in the genetic variability of populations. Without mutations, all genetic diversity would eventually be lost due to factors like genetic drift or selective pressures. Additionally, while gene flow (the transfer of alleles between populations) can introduce existing alleles from one population to another, it does not create new alleles. Natural selection acts on the existing variation within a population, selecting for or against alleles based on fitness, but it does not create new genetic variation either. Genetic drift involves random fluctuations in allele frequencies, which can lead to the loss of alleles rather than introducing new ones. Therefore, mutation stands out as the primary evolutionary mechanism responsible for introducing new alleles into populations, ensuring a continuous source of genetic diversity that is essential for evolution.

3. To evaluate if beetle color is subject to natural selection, which experiment would best assess survival rates?

- A. Testing the heritability of color
- B. Measuring the overall population size
- C. Assessing reproductive advantages of color

D. Testing which colors survive to maturity

The chosen option effectively addresses the goal of evaluating whether beetle color is under the influence of natural selection by directly measuring survival rates based on color variation. In this context, the critical factor is understanding how different colors of beetles fare in their environment, particularly regarding their ability to survive to maturity. By testing and observing which color morphs reach maturity, researchers can infer whether certain colors confer a survival advantage or disadvantage. This approach aligns with the foundational principles of natural selection, which emphasize differential survival and reproduction based on specific traits. A successful demonstration of color-related survival would suggest that the trait is influenced by natural selection, as those beetles with colors that enhance their survival will be more likely to reach reproductive age and pass on their genes. The other choices do not directly measure survival rates: - Assessing heritability of color informs about genetic transmission but does not directly link to survival outcomes in the environment. - Measuring overall population size does not provide insight into the survival of specific color variants; it merely captures the total number of beetles, irrespective of how color impacts their success in survival. - Assessing reproductive advantages focuses on mating success rather than directly examining how color affects the chance of surviving in the wild. Thus, the selected experiment, by

4. What effect does gene flow generally have on populations?

A. Increases genetic diversity

- B. Reduces genetic diversity
- C. Strengthens selection pressure
- D. Has no effect on allele frequencies

Gene flow generally has the effect of increasing genetic diversity within a population. This occurs because gene flow involves the transfer of genetic material between populations, typically through the movement of individuals or their gametes. When individuals from different populations interbreed, they introduce new alleles into the gene pool, which enhances genetic variability. This influx of new genetic material can provide a broader range of traits upon which natural selection can act, potentially leading to more adaptive responses to environmental changes. Additionally, increased genetic diversity can enhance a population's resilience to diseases and environmental stresses, making it better equipped for survival over time. Hence, the correct understanding emphasizes that gene flow serves as a mechanism for enhancing the genetic diversity of populations, fundamentally contributing to evolutionary processes.

5. Which of the following is NOT considered a primary mechanism of evolution?

- A. Natural selection
- B. Genetic drift
- C. Cloning**
- D. Mutations

Cloning is not considered a primary mechanism of evolution because it is a form of asexual reproduction that results in genetically identical individuals. In contrast, the primary mechanisms of evolution—natural selection, genetic drift, and mutations—involve changes in the genetic composition of populations over time which can lead to evolutionary changes. Natural selection is the process where individuals with favorable traits are more likely to survive and reproduce, leading to an increase in those traits in the population. Genetic drift refers to random changes in allele frequencies in a population, particularly in small populations, which can result in significant evolutionary changes over time. Mutations are changes in the DNA sequence that create new genetic variations, serving as the raw material for evolution. Cloning does not introduce new genetic variations or facilitate adaptation to changing environments, making it distinct from these primary evolutionary processes.

6. What does disruptive selection favor in a population?

- A. Intermediate phenotypes
- B. Extreme phenotypes**
- C. Uniform phenotypes
- D. Stable phenotypes

Disruptive selection favors extreme phenotypes within a population, leading to an increase in individual variation by selecting against the average or intermediate traits. This kind of selection occurs when the environment presents conditions that provide advantages to individuals with traits at both ends of the phenotypic spectrum, while individuals with intermediate traits have a lower fitness and reproductive success. A classic example would be a scenario in which a population of birds has a wide variety of beak sizes. If the available food sources are either very small or very large seeds, birds with extreme beak sizes that are highly efficient at accessing these food sources would be more successful than birds with intermediate beak sizes. Over time, this preferential survival of extreme phenotypes can lead to increased divergence within the population and potential speciation.

7. Homologous structures are characterized by what key feature?

- A. Identical function across different species
- B. Similar anatomical features from a common ancestry**
- C. Complete morphological differences among species
- D. Only existing in vertebrates

Homologous structures are defined by their similarity in anatomical features that arise from a common ancestry, despite potentially serving different functions in different species. This suggests that these structures have evolved from a shared ancestor, and therefore, their underlying genetic and developmental pathways are related, even if their external appearances and functions have diverged over time due to adaptation to different environments or lifestyles. For instance, the forelimbs of mammals, such as humans, whales, and bats, have different functions (grasping, swimming, flying) but share a similar bone structure, indicating their common evolutionary origin. This concept underscores the importance of evolutionary relationships and the way species can adapt to their environments while retaining certain fundamental anatomical traits.

8. How does polygenic inheritance contribute to evolution?

- A. By reducing the number of contributing genes to a trait
- B. By creating continuous variation that can be acted upon by natural selection**
- C. By limiting genetic diversity in a population
- D. By promoting isolated traits within a species

Polygenic inheritance plays a significant role in evolution by creating continuous variation in traits, which is crucial for the process of natural selection. In polygenic inheritance, multiple genes contribute to a single trait, resulting in a smooth distribution of phenotypes rather than distinct categories. This continuous variation allows populations to exhibit a range of traits, such as height or skin color, which can be advantageous for survival and reproduction in changing environments. Natural selection acts more effectively on traits that show a range of variation. When individuals in a population possess different phenotypes, selection can favor certain variations over others, ultimately leading to changes in allele frequencies over time. This dynamic process can enhance a population's ability to adapt to environmental pressures, drive speciation, and shape the evolutionary trajectory of a species. Therefore, polygenic inheritance facilitates the raw material that natural selection can work with, asserting its vital contribution to the evolutionary process.

9. In which situation will gene swamping prevent local adaptation?

- A. Selection is strong and migration is low
- B. Gene flow is high and selection is weak**
- C. Selection and migration are both very high in magnitude
- D. Selection and migration are both very low in magnitude

Gene swamping occurs when a high level of gene flow from a population with different traits overwhelms local adaptations, inhibiting the process of natural selection from allowing a population to adapt to its specific environment. When gene flow is high and selection is weak, incoming alleles from a different population can easily incorporate into the local gene pool. This situation dilutes the impact of any existing local adaptations because the alleles being introduced may not be beneficial, or could even be maladaptive, in the local environment. Thus, the strong influx of genes prevents the local population from adapting to its specific conditions since advantageous traits are overshadowed by maladaptive traits coming from the neighboring population. In contrast to this scenario, when selection is strong, local adaptations can be maintained despite some level of gene flow. If migration is low, it further allows the local population to respond to its specific environmental pressures without the interference of external alleles. High selection and migration would still favor local adaptations depending on the balance between the two factors, while both being low would generally allow populations to adapt more effectively as there would be minimal interference. Therefore, the assertion that high gene flow combined with weak selection can lead to gene swamping effectively captures why local adaptation can be undermined in this circumstance.

10. Which type of allele leads to wet earwax in humans?

- A. W allele**
- B. w allele
- C. Dominant allele
- D. Recessive allele

The W allele is associated with wet earwax in humans because it is the dominant form of the gene responsible for this trait. In genetics, dominant alleles express their traits when present in just one copy, while recessive alleles require two copies to express a trait fully. The presence of at least one W allele leads to the production of wet earwax, which is a characteristic phenotype. In terms of inheritance, individuals with one or two copies of the W allele will exhibit the wet earwax phenotype, whereas those with two copies of the recessive w allele will manifest dry earwax. This dominance relationship illustrates the basic principles of Mendelian genetics, where dominant alleles overshadow the effects of recessive alleles in heterozygous conditions. Understanding this concept is vital for studying the inheritance patterns and phenotypic expressions of traits in populations.

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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://asu-bio345exam1.examzify.com>

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

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