

ARIZONA STATE UNIVERSITY (ASU) BIO182 GENERAL BIOLOGY II EXAM 2 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. What does the selection coefficient measure?**
 - A. The average fitness of a population
 - B. The lower fitness of the inferior genotype
 - C. The impact of mutations
 - D. The allele frequency
- 2. What is genetic drift?**
 - A. A systematic change in dominant phenotypes
 - B. A process that affects only large populations
 - C. A random change in allele frequencies
 - D. A directed change resulting from natural selection
- 3. What does the drift primarily affect in a population?**
 - A. Population size
 - B. Gene flow
 - C. Genetic diversity
 - D. Net mutation rate
- 4. What concept refers to the gradual change in the genetic composition of a population over time?**
 - A. Gene drift
 - B. Genetic mutation
 - C. Evolution
 - D. Genomic imprinting
- 5. Which term refers to the science of naming, defining, and classifying biological organisms based on shared characteristics?**
 - A. Taxonomy
 - B. Homology
 - C. Molecular phylogenetics
 - D. Synamorph

6. What occurs during the process of transcription?

- A. Translation of RNA to protein
- B. Synthesis of DNA from RNA
- C. Synthesis of RNA from a DNA template
- D. Replication of DNA strands

7. In population genetics, what does "allele frequency" refer to?

- A. The proportion of a specific allele among all alleles in a population
- B. The total number of alleles present in a population
- C. The genetic traits that are most common within a population
- D. The occurrence of mutations in a single generation

8. What does the term "genotype" refer to?

- A. The observable characteristics of an organism
- B. The genetic constitution or makeup of an organism
- C. The environmental influences on an organism
- D. The evolutionary history of an organism

9. What are homologous chromosomes?

- A. Chromosomes that are identical in all aspects
- B. Pairs of chromosomes with the same genes but different alleles
- C. Chromosomes that lack any genetic variation
- D. Unpaired chromosomes in the nucleus

10. What describes the structure of DNA?

- A. A single strand of nucleotides
- B. A double helix composed of nucleotides
- C. A linear arrangement of amino acids
- D. Two parallel strands of sugars

Answers

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

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Explanations

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1. What does the selection coefficient measure?

- A. The average fitness of a population
- B. The lower fitness of the inferior genotype**
- C. The impact of mutations
- D. The allele frequency

The selection coefficient is a measure of the relative fitness of a particular genotype compared to others in the same population. It specifically quantifies how much less fit an inferior genotype is when compared to the most fit genotype. A selection coefficient close to zero indicates that the genotype is nearly as fit as the optimal genotype, while a value closer to one suggests that it is significantly less fit, meaning that individuals with this genotype will likely experience lower survival or reproduction rates. In this context, the selection coefficient provides invaluable insights into how certain traits may be favored or disfavored in a population over time, allowing for a better understanding of evolutionary dynamics. This metric is critical in evolutionary biology because it helps researchers assess how natural selection operates on different genetic variations within a population.

2. What is genetic drift?

- A. A systematic change in dominant phenotypes
- B. A process that affects only large populations
- C. A random change in allele frequencies**
- D. A directed change resulting from natural selection

Genetic drift is defined as a random change in allele frequencies within a population over time. This phenomenon occurs due to chance events that lead to the disproportionate survival or reproduction of certain genotypes, which can cause specific alleles to become more or less common independently of their influence on fitness. In smaller populations, genetic drift can have a more pronounced effect because random events can significantly impact the genetic makeup from one generation to the next. For instance, if a natural disaster occurs, it might randomly eliminate a large number of individuals from the population, which could lead to certain alleles being lost entirely while others may become fixed simply due to the influence of chance rather than any selection for or against them. This randomness is the key characteristic that distinguishes genetic drift from other mechanisms of evolution, such as natural selection which acts on phenotypes rather than directly influencing allele frequencies through chance alone.

3. What does the drift primarily affect in a population?

- A. Population size
- B. Gene flow
- C. Genetic diversity**
- D. Net mutation rate

Drift primarily affects genetic diversity within a population. Genetic drift is a mechanism of evolution that occurs due to random sampling effects from one generation to the next, particularly in small populations. When random events or chance occurrences influence which alleles are passed on to the next generation, it can lead to changes in allele frequencies and ultimately reduce genetic diversity. As alleles become fixed or lost, the overall genetic variability within the population may decline. This reduction in diversity can make populations more vulnerable to disease, changing environments, and reduces their ability to adapt to new selective pressures. Thus, genetic drift plays a crucial role in shaping the genetic structure of populations and their ability to evolve over time. In contrast, while population size, gene flow, and net mutation rate are important factors in evolution and population dynamics, they are not directly influenced by genetic drift. Population size may influence the extent of drift but is not a direct product of it; gene flow relates to the movement of alleles between populations; and the mutation rate pertains to the rate at which new genetic variants are introduced.

4. What concept refers to the gradual change in the genetic composition of a population over time?

- A. Gene drift
- B. Genetic mutation
- C. Evolution**
- D. Genomic imprinting

The concept that refers to the gradual change in the genetic composition of a population over time is evolution. Evolution encompasses the processes that lead to changes in allele frequencies within a population due to various mechanisms, including natural selection, genetic drift, mutation, and gene flow. This ongoing process explains the adaptation of species to their environments and the emergence of new species over prolonged periods. While genetic mutation contributes to evolution by introducing new genetic variations into a population, it is just one aspect of the broader concept of evolutionary change. Gene drift refers specifically to random changes in allele frequencies in small populations, which can lead to significant evolutionary changes over time, but does not encompass all evolutionary processes. Genomic imprinting involves the differential expression of genes depending on their parental origin and does not address changes in genetic composition across a population. In summary, evolution is the overarching process that accounts for genetic changes across generations within a population, capturing the multifaceted mechanisms that drive biological diversity and adaptation.

5. Which term refers to the science of naming, defining, and classifying biological organisms based on shared characteristics?

- A. Taxonomy**
- B. Homology
- C. Molecular phylogenetics
- D. Synamorph

The term that refers to the science of naming, defining, and classifying biological organisms based on shared characteristics is taxonomy. Taxonomy encompasses the hierarchical organization of living organisms, allowing scientists to group them into categories such as kingdoms, phyla, classes, orders, families, genera, and species. This classification is based on shared traits and evolutionary relationships, facilitating communication and understanding among biologists. Homology pertains to the presence of traits in different species that stem from a common ancestor, and while it is important in taxonomy, it does not define the overarching field itself. Molecular phylogenetics refers to the analysis of genetic information to construct evolutionary relationships, which complements taxonomy but is a more specific tool rather than the broader field. Synamorph is a specific type of shared derived trait that is used in phylogenetic classification, but it is just one element within the broader framework of taxonomy.

6. What occurs during the process of transcription?

- A. Translation of RNA to protein
- B. Synthesis of DNA from RNA
- C. Synthesis of RNA from a DNA template**
- D. Replication of DNA strands

The process of transcription involves the synthesis of RNA from a DNA template. During transcription, an enzyme called RNA polymerase binds to a specific region of the DNA at a promoter sequence. The RNA polymerase unwinds the DNA double helix and copies one of the strands of DNA, synthesizing a complementary RNA strand. This newly formed RNA strand is synthesized in the 5' to 3' direction and is complementary to the DNA template strand, which means that where the DNA has an adenine (A), the RNA will have a uracil (U) instead of thymine (T). Transcription is crucial as it converts the genetic instructions encoded in DNA into a format that can be read and used to produce proteins during the subsequent process of translation. The RNA produced can be mRNA (messenger RNA), tRNA (transfer RNA), or rRNA (ribosomal RNA), each serving different roles in protein synthesis and other cellular functions. Understanding this process illuminates how genetic information is expressed within a cell and is a fundamental concept in molecular biology and genetics.

7. In population genetics, what does "allele frequency" refer to?

- A. The proportion of a specific allele among all alleles in a population**
- B. The total number of alleles present in a population
- C. The genetic traits that are most common within a population
- D. The occurrence of mutations in a single generation

Allele frequency refers to the proportion of a specific allele among all alleles for a particular gene in a population. It provides insight into the genetic diversity of that population and how common or rare a particular variant of a gene is compared to others present in that gene pool. High allele frequency suggests that the allele is prevalent, while low allele frequency indicates that it is less common. Understanding allele frequencies is crucial for studying evolution, as changes in these frequencies can suggest shifts in population dynamics, selective pressures, or genetic drift. In contrast, the total number of alleles in a population does not provide meaningful information about genetic variation without considering how many of each allele are present, making the concept of frequency more useful. The notion of the most common genetic traits relates to phenotypic traits rather than directly addressing genetic variation at the level of alleles. Lastly, the occurrence of mutations is an important aspect of genetic diversity, but it doesn't define allele frequency, which specifically concerns the existing alleles rather than new mutations arising in a generation.

8. What does the term "genotype" refer to?

- A. The observable characteristics of an organism
- B. The genetic constitution or makeup of an organism**
- C. The environmental influences on an organism
- D. The evolutionary history of an organism

The term "genotype" refers to the genetic constitution or makeup of an organism. This encompasses all the hereditary information encoded in its DNA, including both alleles that may be expressed in the phenotype and those that may not be visibly expressed. The genotype determines an organism's potential traits and is foundational to understanding inheritance, variation, and the underlying biology of organisms. When discussing organismal traits, the observable characteristics are described by the term "phenotype," which is influenced by both the genotype and environmental factors. Environmental influences are crucial for understanding how traits may manifest in different contexts, but they do not define the organism's genetic makeup. The evolutionary history of an organism pertains to its phylogeny and relationships with other species over time, which is separate from the specific genetic information contained within an individual organism's genotype. Understanding the distinction between genotype and these other concepts is essential for studying genetics and biological diversity.

9. What are homologous chromosomes?

- A. Chromosomes that are identical in all aspects
- B. Pairs of chromosomes with the same genes but different alleles**
- C. Chromosomes that lack any genetic variation
- D. Unpaired chromosomes in the nucleus

Homologous chromosomes refer to pairs of chromosomes that have the same genes at the same loci but can carry different versions, or alleles, of those genes. During sexual reproduction, organisms inherit one chromosome of each pair from each parent, resulting in homologous pairs. This genetic diversity is crucial for evolution and adaptation, as different alleles can lead to variations in traits among offspring. For instance, in humans, one chromosome of each pair may carry a gene for blue eyes while the homologous chromosome from the other parent may carry a gene for brown eyes. This pairing allows for the possibility of different expressions of traits in the offspring depending on which alleles are inherited. Other options provided do not accurately capture the definition: identical chromosomes imply no variation, which contradicts the concept of homologous chromosomes that allows for different forms. Claiming that homologous chromosomes lack genetic variation overlooks the very nature of genetic diversity associated with these chromosomes. Lastly, unpaired chromosomes suggest a lack of pairing which is fundamental to the concept of homologous chromosomes, as they are always represented in pairs in diploid organisms.

10. What describes the structure of DNA?

- A. A single strand of nucleotides
- B. A double helix composed of nucleotides**
- C. A linear arrangement of amino acids
- D. Two parallel strands of sugars

The structure of DNA is best described as a double helix composed of nucleotides. This unique configuration consists of two long strands of nucleotides that twist around each other, resembling a ladder or spiral staircase. Each nucleotide is made up of three components: a sugar molecule (deoxyribose), a phosphate group, and a nitrogenous base (adenine, thymine, cytosine, or guanine). The specific pairing of the nitrogenous bases – adenine with thymine and cytosine with guanine – forms the rungs of the helix, while the sugar-phosphate backbone constitutes the sides of the ladder. This structure is critical for DNA's function in storing and transmitting genetic information, as it allows for the precise replication and encoding of genetic material during cell division. The other choices do not accurately represent the structure of DNA. For instance, stating that DNA is a single strand of nucleotides ignores the essential double-stranded nature of its molecular architecture. The idea of a linear arrangement of amino acids reflects protein structures rather than nucleic acids. Lastly, describing DNA as two parallel strands of sugars misrepresents its true composition, which involves nucleotides with phosphate and nitrogenous bases as well,

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-bio182exam2.examzify.com>

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

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