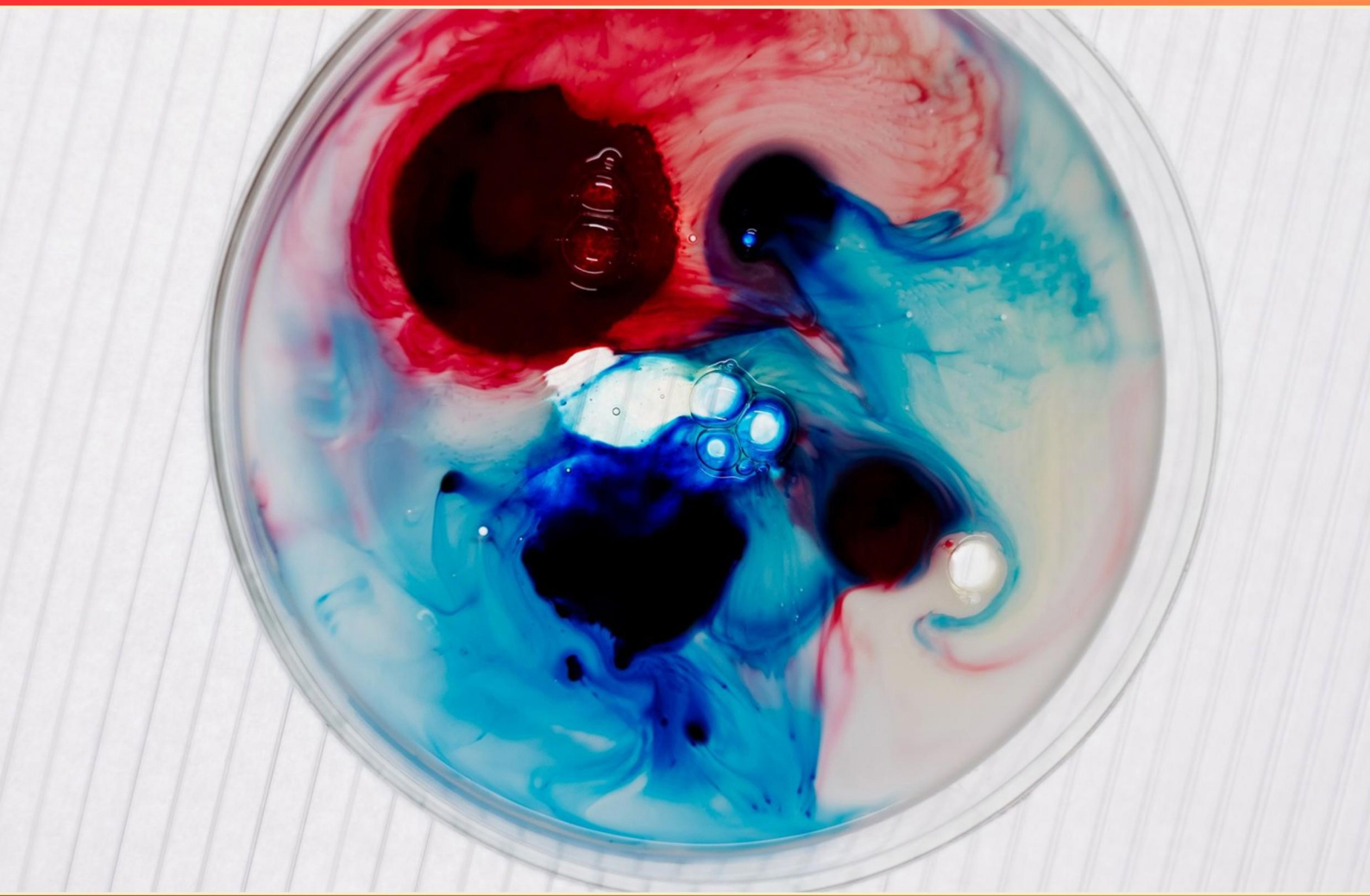
NYSTCE 160 – BIOLOGY PRACTICE EXAM (SAMPLE)

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. Which organelle is primarily responsible for energy production in cells?

A. Ribosome

B. Nucleus

C. Mitochondria

D. Chloroplast

2. What field of study focuses on the distribution of allele frequency changes within populations?

A. Population genetics

B. Molecular biology

C. Ecology

D. Phylogenetics

3. What is the correct order of the scientific method?

A. Observation, analysis, conclusion, hypothesis, experiment

B. Hypothesis, observation, conclusion, analysis, experiment

C. Question, hypothesis, experiment, observation, analysis, conclusion

D. Analysis, conclusion, experiment, question, hypothesis, observation

4. Which organelles are found in plant cells?

A. Nucleus and mitochondria

B. Chloroplasts and central vacuole

C. Lysosomes and ribosomes

D. Centrioles and vacuoles

5. What principle does Hanawalt's law of biology assert?

A. Chemical reactions must always be spontaneous

B. Chemical reactions can be both spontaneous and non-spontaneous

C. Chemical reactions only occur in specific organisms

D. Chemical reactions are exclusively non-spontaneous

6. Which bacteria types provide the atmosphere with N2?

A. Nitrogen-fixing bacteria

B. Denitrifying bacteria

C. Pathogenic bacteria

D. Photosynthetic bacteria

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7. What are characteristics of Dercum disease?

A. Loss of muscle mass

B. Fatigue and weakness

C. Benign fatty masses

D. Increased bone density

8. How many atoms are present in nitrogen gas (N_2)?

A. One

B. Two

C. Three

D. Four

9. Which model is associated with an increase in the quantity of free energy?

A. Equilibrium model

B. Transition-state model

C. Dynamic equilibrium model

D. Closed system model

10. What is the relationship between species diversity and ecosystem stability?

A. The more diversity, the more stable

B. Less diversity leads to more stability

C. Diversity has no impact on stability

D. Stability is unrelated to species diversity

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Answers

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

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Explanations

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1. Which organelle is primarily responsible for energy production in cells?

A. Ribosome

B. Nucleus

C. Mitochondria

D. Chloroplast

The mitochondria are often referred to as the "powerhouses" of the cell, as they play a crucial role in energy production. They generate adenosine triphosphate (ATP), which is the main energy currency of the cell, through a process called cellular respiration. This process involves the conversion of nutrients, primarily glucose, into ATP, with the consumption of oxygen and the release of carbon dioxide as a byproduct. In eukaryotic cells, mitochondria are unique because they have their own DNA and can replicate independently of the cell's nuclear DNA, a feature that supports the endosymbiotic theory, which posits that they originated from free-living bacteria. This ability allows them to efficiently adapt and respond to the metabolic needs of the cell. Other organelles mentioned, such as ribosomes, are primarily involved in protein synthesis; the nucleus is responsible for storing genetic information and regulating gene expression; and chloroplasts, found in plant cells, are vital for photosynthesis, converting sunlight into chemical energy. However, the specific function of generating ATP makes mitochondria the key organelle for energy production in both plant and animal cells.

2. What field of study focuses on the distribution of allele frequency changes within populations?

A. Population genetics

B. Molecular biology

C. Ecology

D. Phylogenetics

The field that focuses on the distribution of allele frequency changes within populations is population genetics. This area of study examines how genetic variation among individuals in a population can change over time due to processes such as natural selection, genetic drift, mutation, and gene flow. Population genetics seeks to understand the genetic structure of populations, how evolutionary forces shape this structure, and the mechanisms that lead to changes in allele frequencies. By analyzing these shifts, researchers can infer patterns of evolution and the adaptive strategies of organisms in response to environmental pressures. Other fields listed, such as molecular biology, primarily explore the biochemical processes within cells, including nucleic acids and protein interactions, rather than focusing on population-level genetic changes. Ecology, while related, is more concerned with interactions among organisms and their environments rather than genetic variability within populations. Phylogenetics deals with evolutionary relationships among species but does not specifically address allele frequency changes within populations.

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3. What is the correct order of the scientific method?

A. Observation, analysis, conclusion, hypothesis, experiment

B. Hypothesis, observation, conclusion, analysis, experiment

C. Question, hypothesis, experiment, observation, analysis, conclusion

D. Analysis, conclusion, experiment, question, hypothesis, observation

The scientific method is a systematic approach used to investigate phenomena, acquire new knowledge, or correct and integrate previous knowledge. The correct order begins with a question that arises from an observation. Following this question, a hypothesis is formulated, which serves as a tentative explanation that can be tested. Next, an experiment is designed and conducted to test the hypothesis. This step is crucial as it involves manipulating variables to see if the predicted outcomes occur. After gathering data from the experiment, observations are made, leading to an analysis of the results. Finally, the data is used to draw a conclusion, determining whether the hypothesis was supported or refuted based on the experimental results. This structured sequence ensures that investigations are thorough and repeatable, promoting scientific rigor. Therefore, the correct order begins with a question, followed by a hypothesis, then an experiment, leading to observations, analysis, and ultimately a conclusion. This foundational framework is utilized across various scientific disciplines to develop and verify theories.

4. Which organelles are found in plant cells?

A. Nucleus and mitochondria

B. Chloroplasts and central vacuole

C. Lysosomes and ribosomes

D. Centrioles and vacuoles

Plant cells are characterized by the presence of specific organelles that are essential for their unique functions, particularly in photosynthesis and maintaining cell structure. Chloroplasts are crucial because they contain the pigment chlorophyll, which allows plants to capture sunlight and convert it into energy through photosynthesis. This process is vital for plant growth and the overall production of oxygen and organic compounds in the ecosystem. Additionally, plant cells typically contain a central vacuole that plays a significant role in maintaining turgor pressure against the cell wall, which is important for the structural integrity of the plant. The central vacuole also stores nutrients, waste products, and helps in regulating the cell's internal environment. In contrast, while other organelles like the nucleus and mitochondria are present in both plant and animal cells, the presence of chloroplasts and a large central vacuole are distinctive features of plant cells that distinguish them from other types of cells. This enables plant cells to perform photosynthesis and manage hydration and nutrient storage effectively.

5. What principle does Hanawalt's law of biology assert?

A. Chemical reactions must always be spontaneous

B. Chemical reactions can be both spontaneous and non-spontaneous

C. Chemical reactions only occur in specific organisms

D. Chemical reactions are exclusively non-spontaneous

Hanawalt's law of biology asserts that chemical reactions can be both spontaneous and non-spontaneous. This principle reflects the understanding that reactions in biological systems can occur without the input of additional energy (spontaneous), or they may require energy to proceed (non-spontaneous). This flexibility in reaction types is essential for understanding metabolic processes in organisms, where the energy requirements and spontaneity of reactions are highly variable and influenced by numerous factors, including environmental conditions and the presence of catalysts. Recognizing that reactions can be in either category allows for a broader understanding of biochemistry, from cellular respiration to photosynthesis. This principle is foundational in biological chemistry and underpins many processes vital for life.

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6. Which bacteria types provide the atmosphere with N2?

A. Nitrogen-fixing bacteria

B. Denitrifying bacteria

C. Pathogenic bacteria

D. Photosynthetic bacteria

Denitrifying bacteria are responsible for converting nitrogenous compounds in the soil back into nitrogen gas (N2), which is then released into the atmosphere. This process, known as denitrification, is a crucial part of the nitrogen cycle, allowing nitrogen to return to the atmosphere after being used in various biological processes. During denitrification, these bacteria utilize nitrates and nitrites as electron acceptors, reducing them ultimately to nitrogen gas. This process helps maintain the balance of nitrogen in the ecosystem, preventing the accumulation of nitrogen compounds in the soil and water, which can lead to pollution and other ecological issues. While nitrogen-fixing bacteria do play an essential role in the nitrogen cycle by converting atmospheric nitrogen (N2) into ammonia, they are not the organisms responsible for returning N2 to the atmosphere. Pathogenic bacteria are typically associated with diseases and do not play a role in the nitrogen cycle. Photosynthetic bacteria generally capture energy and do not contribute significantly to nitrogen gas production.

7. What are characteristics of Dercum disease?

A. Loss of muscle mass

B. Fatigue and weakness

C. Benign fatty masses

D. Increased bone density

Dercum disease, also known as adiposis dolorosa, is characterized primarily by the presence of painful fatty masses, which are indeed benign. These masses often develop subcutaneously and can vary in size. The disease is also associated with a variety of systemic symptoms, including pain, which is a defining characteristic of the condition. In the context of the question, the presence of these benign fatty tumors is the hallmark of Dercum disease, distinguishing it from other disorders that may involve muscle mass loss, fatigue, or changes in bone density. While individuals with Dercum disease may experience other symptoms, the defining characteristic that directly relates to the disease's identification is the formation of these benign fatty masses.

8. How many atoms are present in nitrogen gas (N2)?

A. One

B. Two

C. Three

D. Four

Nitrogen gas is composed of molecular nitrogen, which has the chemical formula N2. This notation indicates that each molecule of nitrogen gas consists of two nitrogen atoms bonded together. In this diatomic form, N2 molecules are the most common and stable form of nitrogen found in nature. Thus, when discussing the number of atoms in a single molecule of nitrogen gas, it clearly contains two atoms of nitrogen. This understanding is crucial in various scientific contexts, especially when examining molecular structure, chemical reactions, or gas laws.

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9. Which model is associated with an increase in the quantity of free energy?

A. Equilibrium model

B. Transition-state model

C. Dynamic equilibrium model

D. Closed system model

The transition-state model is associated with an increase in the quantity of free energy because it describes the state during a chemical reaction where reactants are transformed into products. In this model, the transition state represents a high-energy state that is reached during the reaction process. Essentially, this high-energy intermediate decreases the activation energy for the reaction to proceed, allowing the system to move from reactants to products. As reactants are converted to products, free energy changes occur, which reflect the energy stored in the molecular bonds of the chemicals involved. The transition-state model highlights the importance of the energy barrier that must be overcome for a reaction to occur. Thus, the model is crucial for understanding how the energy profile of a reaction can lead to an overall change in free energy as reactants transition through various states. The concept of equilibrium does not apply here as it refers to a state where the forward and reverse reaction rates are equal, and there is no net change in free energy. Similarly, the dynamic equilibrium model emphasizes stability rather than free energy changes, and a closed system model does not specifically account for the free energy associated with reaction dynamics.

10. What is the relationship between species diversity and ecosystem stability?

A. The more diversity, the more stable

B. Less diversity leads to more stability

C. Diversity has no impact on stability

D. Stability is unrelated to species diversity

The relationship between species diversity and ecosystem stability is generally characterized by the idea that greater biodiversity contributes to increased stability within an ecosystem. Higher species diversity often leads to more complex interactions among various organisms, which can enhance ecosystem functions such as nutrient cycling, resilience to disturbances, and adaptability to changing environmental conditions. When ecosystems harbor a wide variety of species, they are better equipped to withstand stresses such as disease outbreaks, climate change, or habitat destruction. This is because diverse ecosystems can maintain critical processes even if some species are lost. For example, if one species is affected by a disease, other species may fulfill similar roles, helping to sustain the ecosystem's functionality. Conversely, ecosystems with low species diversity may be more vulnerable to disturbances, as the loss of a single species can have significant negative effects on overall ecosystem health and function. Therefore, a greater diversity of species is generally seen as a fundamental component of ecosystem resilience and stability. This understanding underpins the importance of biodiversity conservation efforts in maintaining healthy ecosystems.

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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://nystce160.examzify.com

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

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