

PLTW BIOMEDICAL SCIENCE PRACTICE TEST (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. What best defines a clinical trial?**
 - A. A research study assessing new medications or treatments
 - B. An observational study about disease progression
 - C. A survey about patient satisfaction
 - D. A case study of individual patient outcomes
- 2. What is the study of how disease processes affect the function of the body called?**
 - A. Pathology
 - B. Pathophysiology
 - C. Physiology
 - D. Histology
- 3. What does a phylogenetic tree illustrate?**
 - A. The hierarchical structure of living organisms
 - B. The feeding relationships in an ecosystem
 - C. The evolutionary relationships among biological species
 - D. The anatomical structure of various species
- 4. What are some changes that occur in a body after death?**
 - A. Changes in temperature
 - B. Clouding of the corneas
 - C. Liver mortis
 - D. All of the above
- 5. Through which structures is genetic information inherited from parents to offspring?**
 - A. Chromosomes
 - B. Proteins
 - C. Lipids
 - D. Nucleotides

- 6. What is a major function of the adrenal gland?**
- A. Regulation of metabolism
 - B. Production of insulin
 - C. Filtration of blood
 - D. Transport of oxygen
- 7. Which of the following is a key ethical consideration in biomedical research?**
- A. Commercial viability
 - B. Informed consent
 - C. Profitability
 - D. Marketing strategies
- 8. What is the main structural component of a neuron?**
- A. Cell membrane
 - B. Nucleus
 - C. Synapse
 - D. Cell body
- 9. What is the primary purpose of the lymphatic system?**
- A. To regulate heart rate
 - B. To defend against pathogens
 - C. To produce hormones
 - D. To store energy
- 10. What are the main stages of the cell cycle?**
- A. Interphase and mitotic phase
 - B. G1, S, G2, and mitotic phase
 - C. Interphase only
 - D. Prophase, metaphase, anaphase, and telophase

Answers

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

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Explanations

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1. What best defines a clinical trial?

- A. A research study assessing new medications or treatments**
- B. An observational study about disease progression
- C. A survey about patient satisfaction
- D. A case study of individual patient outcomes

A clinical trial is primarily defined as a research study that investigates the efficacy and safety of new medications or treatments through systematic testing either on human participants or in specific disease models. The design of clinical trials is structured around protocols that outline the study's objectives, methodology, and assessments to evaluate the outcomes of the intervention. This type of research is critical in the development and approval of new therapies, as it adheres to rigorous standards to ascertain how a treatment compares to existing options or assesses its safety and effectiveness. The goal is to establish whether a new treatment can make a positive impact on health outcomes when compared to either a placebo or established standard treatments. In contrast, the other options involve different methodologies and objectives, such as observational studies focusing on how diseases progress over time, surveys that gather patient feedback, or case studies that delve into individual patient experiences, rather than assessing new medical treatments in a controlled trial setting. Each of these approaches contributes valuable information to the medical field but does not encapsulate the fundamental essence of what a clinical trial entails.

2. What is the study of how disease processes affect the function of the body called?

- A. Pathology
- B. Pathophysiology**
- C. Physiology
- D. Histology

The study of how disease processes affect the function of the body is referred to as pathophysiology. This discipline combines aspects of pathology (the study of disease) with physiology (the study of normal biological function) to understand how diseases can disrupt the normal processes and mechanisms within the body. Pathophysiology focuses on the changes that occur at various levels, including cellular, organ, and systemic, as a result of disease. This understanding is crucial for diagnosing diseases, determining their progression, and developing appropriate treatment strategies. In contrast, pathology primarily involves the examination of tissues and bodily fluids to identify diseases, while physiology concentrates on the normal functions of the body systems. Histology, another related field, is specifically concerned with the microscopic structure of tissues. These distinctions highlight why pathophysiology is the most suitable term for studying the impact of diseases on body functions.

3. What does a phylogenetic tree illustrate?

- A. The hierarchical structure of living organisms
- B. The feeding relationships in an ecosystem
- C. The evolutionary relationships among biological species**
- D. The anatomical structure of various species

A phylogenetic tree illustrates the evolutionary relationships among biological species. It is a diagram that represents the evolutionary history of a group of organisms, showing how species are related through common ancestors. Each branch of the tree represents a lineage, and the points where branches split indicate when two lineages diverged from a common ancestor. This representation helps scientists and researchers understand how species have evolved over time, including the genetic distances between them. It visually conveys the concept of descent with modification, highlighting the connections among diverse forms of life. Phylogenetic trees are constructed based on various data, including genetic, morphological, and molecular characteristics, which provide evidence of the evolutionary pathways that have shaped the diversity of life on Earth. The other options, while related to biological concepts, do not accurately describe the function of a phylogenetic tree. Hierarchical structures of living organisms or anatomical structures pertain to classification or morphology and do not directly depict evolutionary relationships. Feeding relationships are typically represented in food webs or ecological diagrams rather than in a phylogenetic context. Hence, recognizing the specific purpose of phylogenetic trees as a tool for illustrating evolutionary connections highlights why the correct answer is based on evolutionary relationships.

4. What are some changes that occur in a body after death?

- A. Changes in temperature
- B. Clouding of the corneas
- C. Liver mortis
- D. All of the above**

After death, the body undergoes several physiological changes that can be observed and studied. These changes include changes in temperature, clouding of the corneas, and livor mortis. Changes in temperature, often referred to as algor mortis, occur as the body cools down to match the ambient temperature. This process begins shortly after death and can provide estimations of the time elapsed since death. Clouding of the corneas typically happens within a few hours after death due to a loss of moisture and the cessation of normal physiological functions, leading to changes in the appearance of the eyes. Livor mortis, or postmortem hypostasis, is the pooling of blood in the lower parts of the body due to gravity, which begins shortly after death and can be a critical indicator of the position of the body at the time of death. The correct answer encompasses all of these changes, demonstrating a comprehensive understanding of postmortem processes. Each of these phenomena provides valuable information in forensic science and can assist in determining the circumstances surrounding an individual's death.

5. Through which structures is genetic information inherited from parents to offspring?

A. Chromosomes

B. Proteins

C. Lipids

D. Nucleotides

Genetic information is inherited from parents to offspring primarily through chromosomes. Chromosomes are long, thread-like structures composed of DNA, which carries the genes that encode for the traits and characteristics of an organism. Each chromosome contains numerous genes, and during reproduction, the genetic material from both parents (combining their chromosomes) is passed on to the offspring. In humans and most organisms, chromosomes are located in the nucleus of cells, and they exist in pairs, with one chromosome of each pair coming from the mother and the other from the father. This arrangement ensures that offspring receive a combination of genetic information that contributes to their own unique genetic identity. While proteins, lipids, and nucleotides are essential in biological systems, they do not serve as the primary carriers of genetic information. Proteins carry out various functions in the body, lipids are key components of cell membranes and energy storage, and nucleotides are the building blocks of DNA and RNA, but it is the structure of chromosomes that plays the crucial role in inheritance.

6. What is a major function of the adrenal gland?

A. Regulation of metabolism

B. Production of insulin

C. Filtration of blood

D. Transport of oxygen

The major function of the adrenal gland is the regulation of metabolism, which encompasses a variety of processes that manage how the body converts food into energy, responds to stress, and maintains overall homeostasis. The adrenal glands, located on top of each kidney, produce hormones such as cortisol, which plays a significant role in glucose metabolism and the body's response to stress. Other hormones produced by the adrenal glands, including adrenaline and norepinephrine, are crucial for the 'fight or flight' response, further supporting metabolic functions during stressful situations. The other options are associated with different bodily systems and organs. The production of insulin is primarily the function of the pancreas, which regulates blood sugar levels. Filtration of blood is mainly performed by the kidneys, which remove waste products and excess substances from the bloodstream. The transport of oxygen is the main role of red blood cells in the circulatory system, facilitated by the protein hemoglobin. Each of these processes is essential for health, but they are not performed by the adrenal glands.

7. Which of the following is a key ethical consideration in biomedical research?

- A. Commercial viability
- B. Informed consent**
- C. Profitability
- D. Marketing strategies

Informed consent is a fundamental ethical consideration in biomedical research because it ensures that participants understand the nature of the study, including any potential risks and benefits before agreeing to partake. This process involves providing clear, comprehensive information about the research purposes, procedures, possible discomforts, and the right to withdraw at any time without penalty. Informed consent is essential for respecting the autonomy of individuals, allowing them to make knowledgeable decisions regarding their participation. It serves to protect human subjects and uphold the integrity of the research, fostering trust between researchers and participants. The other options, while relevant to various aspects of biomedical research, do not prioritize the ethical treatment of participants. Commercial viability, profitability, and marketing strategies focus more on the economic aspects and overall success of a product or research endeavor rather than the ethical implications of participant involvement.

8. What is the main structural component of a neuron?

- A. Cell membrane
- B. Nucleus
- C. Synapse
- D. Cell body**

The cell body is indeed the main structural component of a neuron. It houses the nucleus, which contains the cell's genetic material, and is responsible for maintaining the overall health and function of the neuron. Within the cell body, there are also various organelles and structures that play critical roles in producing proteins and neurotransmitters essential for neuronal function. The cell body extends its processes into dendrites and an axon, which are crucial for receiving and transmitting signals. Dendrites receive incoming signals from other neurons, while the axon conducts these impulses away from the cell body to communicate with other neurons or muscles. Thus, the cell body serves as the central hub from which the neuron carries out these essential functions, making it the foundational structure of neuronal organization and activity.

9. What is the primary purpose of the lymphatic system?

- A. To regulate heart rate
- B. To defend against pathogens**
- C. To produce hormones
- D. To store energy

The primary purpose of the lymphatic system is to defend against pathogens. This system plays a crucial role in the body's immune response by filtering lymph, a fluid that circulates throughout the body, and by providing a site for lymphocytes, which are a type of white blood cell responsible for fighting infections. The lymphatic system includes lymph nodes, which trap bacteria and viruses and facilitate their destruction by immune cells. In addition to acting as a key component of the immune system, the lymphatic system also helps to maintain fluid balance in the body and absorb fats from the digestive system, but its primary and most vital role remains in the protection against diseases and infections. Therefore, the correct answer highlights the lymphatic system's essential function in maintaining health through immune defense mechanisms.

10. What are the main stages of the cell cycle?

- A. Interphase and mitotic phase
- B. G1, S, G2, and mitotic phase**
- C. Interphase only
- D. Prophase, metaphase, anaphase, and telophase

The main stages of the cell cycle encompass distinct phases that are crucial for cell growth and division. The correct choice highlights the comprehensive stages that occur during the cell cycle: G1 (Gap 1), S (Synthesis), G2 (Gap 2), and the mitotic phase. In the G1 phase, the cell undergoes growth and prepares for DNA replication. The S phase is where DNA synthesis occurs, resulting in the duplication of chromosomes. Following this, G2 is another growth phase where the cell prepares for mitosis, ensuring all necessary components are in place for a successful cell division. The mitotic phase, which includes the processes of prophase, metaphase, anaphase, and telophase, is where the actual division of the cell occurs, leading to the formation of two daughter cells. Recognizing the importance of each of these stages is essential for understanding how cells replicate and maintain their functions in living organisms. This thorough description of the cell cycle underscores the significance of both interphase, which includes G1, S, and G2, and the mitotic phase in the overall process of cellular reproduction.

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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://pltwbiomedscience.examzify.com>

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

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