

SACE STAGE 2 BIOLOGY PRACTICE EXAM (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. Which of the following factors is NOT an abiotic factor affecting plant distribution?**
 - A. Soil pH
 - B. Oxygen levels
 - C. Competition with other plants
 - D. Light availability

- 2. What hormone is primarily affected in Type 1 Diabetes?**
 - A. Glucagon
 - B. Growth hormone
 - C. Insulin
 - D. Cortisol

- 3. What is the structure of DNA characterized by?**
 - A. Single strand with circular structure
 - B. Linear shape with nucleotide subunits
 - C. Double helix shape with nucleotide subunits
 - D. Multiple strands with random arrangement

- 4. Which stage of aerobic respiration is represented by the equation $C_6H_{12}O_6 + 6O_2 = 6CO_2 + 6H_2O$?**
 - A. Glycolysis
 - B. Krebs Cycle
 - C. Electron Transport Chain
 - D. Photosynthesis

- 5. What are somatic cells?**
 - A. Cells involved in reproduction.
 - B. Body cells excluding germ cells.
 - C. Cells that produce hormones.
 - D. Cells that are only found in plants.

- 6. What process is primarily caused by excessive nitrogen and phosphorous in water bodies?**
- A. Eutrophication
 - B. Bioaccumulation
 - C. Habitat fragmentation
 - D. Acidification
- 7. Which phase involves the pulling apart of homologous pairs to opposite poles of the cell?**
- A. Anaphase I
 - B. Telophase II
 - C. Prophase II
 - D. Metaphase I
- 8. What distinguishes steroid hormones from other types of hormones?**
- A. They are derived from amino acids
 - B. They are derived from cholesterol
 - C. They are proteins with more than fifty amino acids
 - D. They consist of short chains of amino acids
- 9. What does a high surface area to volume ratio facilitate in cells?**
- A. Slower exchange of materials
 - B. Efficient gas exchange
 - C. Increased energy consumption
 - D. Enhanced cellular division
- 10. What is polyploidy?**
- A. Organisms with a single set of chromosomes
 - B. Cells with more than two sets of chromosomes
 - C. Organisms with no chromosomes
 - D. Cells that have lost chromosomes

Answers

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

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Explanations

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1. Which of the following factors is NOT an abiotic factor affecting plant distribution?

- A. Soil pH
- B. Oxygen levels
- C. Competition with other plants**
- D. Light availability

Abiotic factors refer to the non-living components of an environment that influence the distribution and behavior of organisms, including plants. These factors encompass a range of physical and chemical aspects such as temperature, moisture, light, soil composition, and gases available in the environment. In this context, competition with other plants is a biotic factor—not abiotic—because it involves interactions between living organisms. Biotic factors are associated with the presence and activities of living organisms, including competition for resources like light, space, and nutrients. Soil pH influences the availability of nutrients to plants and, consequently, their growth and distribution. Oxygen levels are crucial for respiration processes in roots and can affect plant health and distribution in varying soil environments. Light availability directly impacts photosynthesis, influencing where certain plants can thrive based on their light requirements. Thus, competition with other plants stands apart as a biotic interaction, while the other factors mentioned are all non-living variables that shape the environment in which plants grow.

2. What hormone is primarily affected in Type 1 Diabetes?

- A. Glucagon
- B. Growth hormone
- C. Insulin**
- D. Cortisol

In Type 1 Diabetes, the primary hormone affected is insulin. This condition arises when the immune system mistakenly attacks and destroys the beta cells in the pancreas that are responsible for producing insulin. Insulin is a crucial hormone for regulating blood glucose levels; it facilitates the uptake of glucose into the cells for energy or storage, thus lowering blood sugar levels. Without sufficient insulin, individuals with Type 1 Diabetes cannot effectively manage their blood glucose, leading to elevated blood sugar levels, which can cause various health complications if not managed appropriately. This condition requires lifelong management typically through insulin therapy, making insulin the key hormone impacted in this type of diabetes. Understanding the role of insulin is critical, as it helps illustrate why people with Type 1 Diabetes need insulin injections or pumps to maintain proper glucose levels and prevent the acute and chronic complications associated with uncontrolled diabetes.

3. What is the structure of DNA characterized by?

- A. Single strand with circular structure
- B. Linear shape with nucleotide subunits
- C. Double helix shape with nucleotide subunits**
- D. Multiple strands with random arrangement

The structure of DNA is characterized by a double helix shape, which consists of two long strands of nucleotides that twist around each other. Each strand is composed of repeating units called nucleotides, which are made up of a sugar, phosphate group, and a nitrogenous base. The double helix structure allows for the complementary base pairing between the strands, where adenine pairs with thymine and cytosine pairs with guanine, providing stability and enabling the replication of genetic information. This unique structure is vital for its function in storing and transmitting genetic information in living organisms. The double helix configuration also plays a significant role in the processes of DNA replication and transcription within cells.

4. Which stage of aerobic respiration is represented by the equation $C_6H_{12}O_6 + 6O_2 = 6CO_2 + 6H_2O$?

- A. Glycolysis
- B. Krebs Cycle**
- C. Electron Transport Chain
- D. Photosynthesis

The equation $C_6H_{12}O_6 + 6O_2 = 6CO_2 + 6H_2O$ represents the overall process of cellular respiration, where glucose ($C_6H_{12}O_6$) is broken down in the presence of oxygen (O_2) to produce carbon dioxide (CO_2) and water (H_2O), ultimately releasing energy. This process occurs in multiple stages, one of which is the Krebs Cycle, also known as the citric acid cycle or tricarboxylic acid cycle (TCA cycle). During the Krebs Cycle, which takes place in the mitochondria, acetyl-CoA derived from glucose (after glycolysis) is oxidized, resulting in the production of carbon dioxide and high-energy electron carriers (NADH and FADH₂). The equation exemplifies the complete oxidation of glucose to carbon dioxide and water, highlighting that the Krebs Cycle is crucial for breaking down glucose and capturing its energy in the form of electron carriers that power the Electron Transport Chain, the final stage of aerobic respiration. In contrast, glycolysis, occurring in the cytoplasm, involves the initial breakdown of glucose into pyruvate and does not produce carbon dioxide or water directly. The Electron Transport Chain is a subsequent step.

5. What are somatic cells?

- A. Cells involved in reproduction.
- B. Body cells excluding germ cells.**
- C. Cells that produce hormones.
- D. Cells that are only found in plants.

Somatic cells are defined as all the body cells that make up the tissues and organs of an organism, excluding germ cells, which are involved in reproduction. This category includes a wide variety of cell types such as skin cells, muscle cells, nerve cells, and blood cells. Somatic cells contain the full set of chromosomes that are characteristic of the organism, usually in pairs, and they play various roles in maintaining the body's structure and function. The correct choice emphasizes that somatic cells encompass all body cells except for germ cells, which are specialized reproductive cells responsible for giving rise to gametes (sperm and eggs). This distinction is critical in biological discussions about cell types, as germ cells undergo meiosis and contribute to genetic diversity through sexual reproduction. In contrast, the other options refer to specific characteristics or types of cells that do not accurately define somatic cells. For instance, somatic cells do not specifically produce hormones, nor are they solely found in plants, and they definitely are not involved exclusively in reproduction. This broader understanding is essential in biology for differentiating between various cell types and their respective functions in an organism.

6. What process is primarily caused by excessive nitrogen and phosphorous in water bodies?

- A. Eutrophication**
- B. Bioaccumulation
- C. Habitat fragmentation
- D. Acidification

Eutrophication is the process that occurs when excessive amounts of nitrogen and phosphorus are introduced into water bodies. These nutrients often originate from agricultural runoff, wastewater discharge, or industrial pollutants. When they enter the water, they stimulate the rapid growth of algae, a phenomenon known as algal blooms. As these algae proliferate, they can deplete oxygen levels in the water when they die and decompose, leading to hypoxia, a condition where there is insufficient oxygen to support aquatic life. This decline in oxygen can result in the death of fish and other organisms, disrupting the entire ecosystem. The excessive nutrient enrichment can also result in harmful algal blooms that produce toxins, further impacting aquatic species and potentially affecting human health. In contrast, bioaccumulation refers to the gradual accumulation of substances, such as pesticides or heavy metals, in an organism over time, which is not directly linked to nutrient levels in water. Habitat fragmentation involves the breaking apart of ecosystems, often due to human activities like urban development, and is unrelated to nutrient compounds. Acidification typically describes a decrease in pH levels in water bodies, largely due to increased CO₂ levels, leading to changes in aquatic chemistry that do not correlate directly with nitrogen and phosphorus levels.

7. Which phase involves the pulling apart of homologous pairs to opposite poles of the cell?

- A. Anaphase I**
- B. Telophase II
- C. Prophase II
- D. Metaphase I

The phase that involves the pulling apart of homologous pairs to opposite poles of the cell is Anaphase I. During this stage of meiosis, the paired homologous chromosomes, which have been aligned at the metaphase plate during Metaphase I, are separated and pulled toward opposite ends of the cell. This separation occurs when the spindle fibers shorten, effectively segregating the homologous chromosomes into two distinct groups. This is a critical step in ensuring that each daughter cell receives one chromosome from each homologous pair, ultimately contributing to genetic diversity in the resulting gametes. In contrast, the other phases mentioned have different functions. Telophase II occurs after the separation of sister chromatids and involves the reformation of the nuclear envelope around each set of chromosomes, but it does not involve pulling homologous pairs apart. Prophase II is the stage where the chromosomes condense again and the spindle apparatus forms without separating any chromosomes. Metaphase I is when homologous chromosomes line up at the metaphase plate but have not yet been aligned for separation. This differentiation in roles among the phases of meiosis clarifies why Anaphase I is the correct answer for this question.

8. What distinguishes steroid hormones from other types of hormones?

- A. They are derived from amino acids
- B. They are derived from cholesterol**
- C. They are proteins with more than fifty amino acids
- D. They consist of short chains of amino acids

Steroid hormones are distinct because they are derived from cholesterol. This characteristic sets them apart from other hormone types, particularly peptide and amine hormones, which are typically derived from amino acids. The structure of steroid hormones is characterized by a core structure of four fused carbon rings, allowing them to easily pass through cell membranes and bind to intracellular receptors. This binding often leads to changes in gene expression and the production of proteins in target cells. In contrast, hormones derived from amino acids, proteins, or short chains of amino acids do not possess this cholesterol-derived structure, impacting their mechanism of action and solubility in the bloodstream. Understanding the biochemical origins of steroid hormones highlights their unique properties and functions within physiological processes.

9. What does a high surface area to volume ratio facilitate in cells?

- A. Slower exchange of materials
- B. Efficient gas exchange**
- C. Increased energy consumption
- D. Enhanced cellular division

A high surface area to volume ratio is a critical factor in cellular function because it enhances the efficiency of material exchange. Cells need to take in nutrients, gases, and other substances while also expelling waste products. When a cell has a larger surface area relative to its volume, there is more area available for these processes to occur, which facilitates faster and more efficient gas exchange. For example, in the case of oxygen uptake during cellular respiration, a high surface area allows for more oxygen molecules to diffuse into the cell at a given time. Similarly, carbon dioxide produced as a waste product can be expelled more rapidly. This is particularly important for cells that have high metabolic rates or those that are involved in gas exchange, such as those found in the lungs or gills of aquatic animals. In contrast, a lower surface area to volume ratio would slow down these processes, making it less effective for the cell to obtain necessary substances and remove waste. Therefore, the correct answer highlights how a high surface area to volume ratio is crucial for efficient gas exchange, supporting overall cellular function and metabolism.

10. What is polyploidy?

- A. Organisms with a single set of chromosomes
- B. Cells with more than two sets of chromosomes**
- C. Organisms with no chromosomes
- D. Cells that have lost chromosomes

Polyploidy refers to a condition in which a cell or an organism has more than two complete sets of chromosomes. This phenomenon is particularly common in plants and can occur due to processes such as errors in cell division or hybridization between species that results in chromosome duplication. For example, instead of the typical diploid state (which contains two sets of chromosomes), a polyploid organism may be triploid, tetraploid, or have even higher multiples of the basic chromosome set. This characteristic can lead to increased genetic diversity and can provide certain advantages, such as greater adaptability to environmental changes or enhanced size and yield in crops. These attributes are significant in plant breeding and agriculture. The other options describe conditions not related to polyploidy. For instance, having a single set of chromosomes refers to haploidy, while organisms with no chromosomes or those that have lost chromosomes describe distinct genetic abnormalities rather than polyploidy.

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://sacestage2bio.examzify.com>

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

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