

Dual Enrollment Biology Practice Test (Sample)

Study Guide



Everything you need from our exam experts!

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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 metabolic pathway occurs in the mitochondria and contributes to ATP production via oxidative phosphorylation?**
 - A. Glycolysis and fermentation
 - B. Photosynthesis
 - C. Krebs cycle and oxidative phosphorylation
 - D. Fermentation only
- 2. Speciation is best defined as the process by which**
 - A. The formation of new species
 - B. The extinction of a species
 - C. The merging of two species into one
 - D. The migration of individuals between populations
- 3. Which statement describes the overall impact of photosynthesis on atmospheric CO₂?**
 - A. Plants release CO₂, increasing atmospheric CO₂
 - B. Plants remove CO₂ from the atmosphere and convert it to organic matter, acting as carbon sinks
 - C. Photosynthesis does not affect atmospheric CO₂
 - D. Photosynthesis increases CO₂ as water splits
- 4. Explain the concept of nutrient limitation and its effect on population growth.**
 - A. Limited nutrients restrict growth; leads to carrying capacity plateau.
 - B. Nutrients always increase growth without limit.
 - C. Nutrient abundance decreases carrying capacity.
 - D. Nutrient limitation speeds up population growth rate indefinitely.
- 5. Kingdom Plantae consists of multicellular eukaryotes that produce their food by photosynthesis.**
 - A. Plantae
 - B. Fungi
 - C. Animalia
 - D. Protista

- 6. Which scenario best illustrates allopatric speciation?**
- A. A geographic barrier such as a river splits populations, leading to divergence
 - B. Divergence due to different feeding habits within the same geographic area
 - C. A polyploid event occurs within the same area
 - D. Hybridization between two species in the same location
- 7. Which organelle conducts photosynthesis in plants and algae, and where do light-dependent reactions occur?**
- A. Mitochondria; cristae
 - B. Chloroplasts; thylakoid membranes
 - C. Chloroplasts; stroma only
 - D. Nucleus; nucleolus
- 8. In what year did the count first exceed 40?**
- A. 1994
 - B. 1983
 - C. 1981
 - D. 1976
- 9. Under antibiotic pressure, natural selection means what?**
- A. The environment was created in which the tuberculosis bacterium carrying the antibiotic-resistant genes had an increased likelihood of survival and reproduction.
 - B. The tuberculosis genes mutated to avoid being killed by the antibiotic.
 - C. The antibiotic becomes weaker due to host metabolism.
 - D. The population becomes entirely resistant to all antibiotics.
- 10. Which statement about carrying capacity is true or most accurately reflects its meaning?**
- A. It is the minimum population size required for persistence
 - B. It is the average population size over time
 - C. It is the maximum population size the environment can sustain indefinitely
 - D. It is the total number of individuals that have ever lived in the population

Answers

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

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Explanations

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1. Which metabolic pathway occurs in the mitochondria and contributes to ATP production via oxidative phosphorylation?

- A. Glycolysis and fermentation
- B. Photosynthesis
- C. Krebs cycle and oxidative phosphorylation**
- D. Fermentation only

Oxidative phosphorylation is the main ATP-making process in the mitochondria, and it relies on the Krebs cycle to supply the needed electron carriers. In the mitochondrial matrix, the Krebs cycle generates NADH and FADH₂. These carriers donate electrons to the electron transport chain in the inner mitochondrial membrane. As electrons move through the chain, protons are pumped across the membrane, creating a proton gradient. ATP synthase then uses this gradient to convert ADP and inorganic phosphate into ATP. This combination—Krebs cycle feeding the electron transport chain and oxidative phosphorylation producing most of the cell's ATP—occurs in the mitochondria. Glycolysis happens in the cytoplasm, fermentation occurs without mitochondria, and photosynthesis takes place in chloroplasts, not mitochondria.

2. Speciation is best defined as the process by which

- A. The formation of new species**
- B. The extinction of a species
- C. The merging of two species into one
- D. The migration of individuals between populations

Speciation is the formation of new species. It happens when populations diverge genetically and become reproductively isolated, so they no longer interbreed to produce fertile offspring. Over time, mutations, natural selection, and genetic drift accumulate differences, often helped by barriers to gene flow such as geographic separation or shifts in mating preferences. This is distinct from extinction (the end of a species) or merging into one species (hybridization that reduces differences), and from migration between populations, which tends to homogenize gene pools and hinder the development of separate lineages.

3. Which statement describes the overall impact of photosynthesis on atmospheric CO₂?

- A. Plants release CO₂, increasing atmospheric CO₂
- B. Plants remove CO₂ from the atmosphere and convert it to organic matter, acting as carbon sinks**
- C. Photosynthesis does not affect atmospheric CO₂
- D. Photosynthesis increases CO₂ as water splits

Photosynthesis acts as a carbon sink by taking carbon dioxide from the air and turning it into organic matter in plant tissues. During this process, CO₂ is fixed with water to form glucose (and other carbohydrates) using light energy, so carbon is stored in plants rather than remaining in the atmosphere. As plants grow, they accumulate biomass that contains carbon, reducing atmospheric CO₂ levels. The other ideas don't fit because photosynthesis uses CO₂ rather than releasing it, and the splitting of water in the light reactions produces oxygen, not CO₂.

4. Explain the concept of nutrient limitation and its effect on population growth.

A. Limited nutrients restrict growth; leads to carrying capacity plateau.

B. Nutrients always increase growth without limit.

C. Nutrient abundance decreases carrying capacity.

D. Nutrient limitation speeds up population growth rate indefinitely.

Nutrient limitation means essential resources like nitrogen or phosphorus are scarce, so organisms can't harvest energy and build biomass as efficiently. When nutrients are limited, the per-capita growth rate drops, births may slow or deaths may rise, and the population grows more slowly until it levels off at a carrying capacity—the maximum population the environment can sustain with the available resources. If nutrients were plentiful, carrying capacity could be higher and growth could proceed further, but with limited nutrients the environment imposes a ceiling. The other statements misstate what happens: unlimited growth isn't possible when resources are finite, abundance doesn't inherently reduce carrying capacity, and limitation does not cause growth to speed up indefinitely.

5. Kingdom Plantae consists of multicellular eukaryotes that produce their food by photosynthesis.

A. Plantae

B. Fungi

C. Animalia

D. Protista

Plants are multicellular eukaryotes that carry out photosynthesis to make their own food. This combination—being multicellular and autotrophic through photosynthesis—defines the kingdom Plantae. They use chloroplasts with chlorophyll to convert light energy, carbon dioxide, and water into sugars, releasing oxygen in the process. Plant cells have cellulose cell walls and store energy as starch, which are additional plant-specific traits. Fungi are multicellular but do not photosynthesize; they obtain nutrients by absorbing from their surroundings. Animals are heterotrophs that ingest or absorb preformed organic matter. Protista is a diverse group that includes many unicellular organisms, with some photosynthetic members, but they are not the multicellular photoautotrophs that characterize plants.

6. Which scenario best illustrates allopatric speciation?

A. A geographic barrier such as a river splits populations, leading to divergence

B. Divergence due to different feeding habits within the same geographic area

C. A polyploid event occurs within the same area

D. Hybridization between two species in the same location

Allopatric speciation happens when populations are physically separated by a geographic barrier, which stops gene flow between them and lets each group evolve on its own path. A river that splits populations creates exactly that situation: the two groups experience different environmental pressures and random genetic changes, so they diverge over many generations. If the barrier remains or lasts long enough, these differences can become strong enough that the two populations can no longer interbreed, even if the barrier is removed later, which is how new species arise through geographic isolation. The other scenarios don't involve geographic separation. Divergence due to different feeding habits within the same area is a form of sympatric speciation driven by ecological differences, not by physical isolation. A polyploid event occurring in the same area is another route to speciation that often happens without geographic barriers, common in plants. Hybridization between two species in the same location involves mixing gene pools rather than splitting them into isolated populations, so it doesn't illustrate the isolation aspect of allopatric speciation.

7. Which organelle conducts photosynthesis in plants and algae, and where do light-dependent reactions occur?

- A. Mitochondria; cristae
- B. Chloroplasts; thylakoid membranes**
- C. Chloroplasts; stroma only
- D. Nucleus; nucleolus

Photosynthesis happens in chloroplasts, the organelles in plant and algal cells that capture light energy. The light-dependent reactions occur on the thylakoid membranes inside those chloroplasts, where chlorophyll and other pigments, along with the photosystems and electron transport chain, use light to split water, generate ATP and NADPH, and release oxygen. The Calvin cycle, which uses that energy, takes place in the stroma. Mitochondria carry out cellular respiration, not photosynthesis, and their cristae are folds of the inner membrane. The nucleus and nucleolus aren't involved in photosynthesis either.

8. In what year did the count first exceed 40?

- A. 1994
- B. 1983
- C. 1981**
- D. 1976

The main idea is to find the first time a count goes above a threshold when you read the data in chronological order. Exceed means strictly greater than 40, so 40 itself doesn't count. Look from the earliest year onward and identify the first year where the count is over 40. In this case, that first crossing happens in 1981. That means earlier years had counts at or below 40 (e.g., 1976), and by 1981 the count has surpassed 40. Years after, like 1983 and 1994, also exceed 40, but they come after the first crossing.

9. Under antibiotic pressure, natural selection means what?

- A. The environment was created in which the tuberculosis bacterium carrying the antibiotic-resistant genes had an increased likelihood of survival and reproduction.**
- B. The tuberculosis genes mutated to avoid being killed by the antibiotic.
- C. The antibiotic becomes weaker due to host metabolism.
- D. The population becomes entirely resistant to all antibiotics.

Natural selection under antibiotic pressure works because the antibiotic creates an environment where only bacteria with resistance traits tend to survive and reproduce. The tuberculosis bacteria that carry antibiotic-resistant genes are more likely to live through the drug treatment and pass those resistance traits to their offspring. Since these traits are heritable, their frequency in the population increases over generations, so the population becomes more resistant to that antibiotic. Mutations can contribute to resistance, but the key idea is differential survival based on existing variation in the population. It's not about the antibiotic physically becoming weaker inside the host, and it's not realistic to expect the entire population to become resistant to all antibiotics, since resistance is specific to each drug and involves particular mechanisms.

10. Which statement about carrying capacity is true or most accurately reflects its meaning?

- A. It is the minimum population size required for persistence
- B. It is the average population size over time
- C. It is the maximum population size the environment can sustain indefinitely
- D. It is the total number of individuals that have ever lived in the population**

Carrying capacity is the maximum number of individuals a population that the environment can sustain indefinitely, given the available resources, space, and ecological interactions. As a population grows, resources become limiting, competition increases, and the growth rate slows until births roughly balance deaths, keeping the population around that limit. This capacity can change if conditions shift, such as changes in resource availability or climate. The other ideas describe different concepts: a minimum viable population relates to long-term persistence and genetic viability, an average over time is just a mean value, and the total number ever lived is a cumulative count, not a sustainability boundary.

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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://dualenrollmentbiology.examzify.com>

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

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