Virginia Biology SOL Practice Test (Sample)

Study Guide

Everything you need from our exam experts!

Table of Contents

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

1. **Which category in biological taxonomy ranks above the class and below the phylum?**

   A. Order

   B. Family

   C. Class

   D. Kingdom

2. **What is the method called when an organism with a dominant phenotype is crossed with a recessive organism to determine the unknown genotype?**

   A. Test cross

   B. Back cross

   C. Hybridization

   D. Gene mapping

3. **What term describes an animal that lacks a backbone or notochord?**

   A. Vertebrate

   B. Invertebrate

   C. Mammal

   D. Crustacean

4. **What term refers to the capability of an organism to produce viable offspring?**

   A. Fertility

   B. Viability

   C. Fecundity

   D. Reproductivity

5. **Which category of genetic information serves as a unit of heredity?**

   A. Chromosome

   B. Protein

   C. Gene

   D. Amino acid

6. What condition does hypertonic refer to in relation to cell environments?

A. Cell swelling due to excess water

B. Equal concentration of solutes

C. Lower concentration of solutes outside

D. Higher concentration of solutes outside

7. Which variable in an experiment responds to changes in the independent variable?

A. Dependent Variable

B. Independent Variable

C. Control Variable

D. Constant Variable

8. An animal that feeds on both plants and animals is referred to as what?

A. Herbivore

B. Carnivore

C. Omnivore

D. Predator

9. What is the process called when two organisms evolve from a common ancestor as a result of different environments?

A. Divergent Evolution

B. Convergent Evolution

C. Gradualism

D. Adaptive Radiation

10. What term describes any animal of the phylum Chordata having a notochord?

A. Mammal

B. Chordate

C. Amphibian

D. Reptile

Answers

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

Explanations

1. Which category in biological taxonomy ranks above the class and below the phylum?

A. Order

B. Family

C. Class

D. Kingdom

In biological taxonomy, the hierarchy is organized into various ranks, and the correct answer to the question about the rank that is above the class and below the phylum is indeed order. The taxonomy ranks from broadest to most specific typically follow this sequence: domain, kingdom, phylum, class, order, family, genus, and species. In this hierarchy, the class is a grouping that includes multiple orders, while the phylum encompasses multiple classes. Therefore, order is positioned directly between class and phylum, making it the appropriate choice for this question. Understanding these ranks is essential for categorizing and organizing living organisms systematically, which helps scientists communicate about biodiversity and evolutionary relationships effectively.

2. What is the method called when an organism with a dominant phenotype is crossed with a recessive organism to determine the unknown genotype?

A. Test cross

B. Back cross

C. Hybridization

D. Gene mapping

The method used when an organism with a dominant phenotype is crossed with a recessive organism to determine the unknown genotype is known as a test cross. This genetic technique allows scientists to figure out whether the dominant phenotype is expressed by a homozygous dominant genotype or a heterozygous genotype. In a test cross, the offspring produced will provide clear evidence about the genotype of the individual with the dominant phenotype. If any offspring display the recessive phenotype, it indicates that the dominant phenotype parent must be heterozygous. If all offspring express the dominant phenotype, the dominant individual could be homozygous. Other methods, such as back cross, hybridization, or gene mapping, serve different purposes in genetics. A back cross typically refers to crossing a hybrid organism back to one of its parents. Hybridization involves the breeding of organisms from different varieties or species to create hybrids, while gene mapping refers to determining the location of genes on a chromosome. Each of these techniques has its specific applications and does not serve the same purpose as the test cross.

3. What term describes an animal that lacks a backbone or notochord?

A. Vertebrate

B. Invertebrate

C. Mammal

D. Crustacean

The term that describes an animal that lacks a backbone or notochord is "invertebrate." Invertebrates make up a vast majority of animal species on Earth, encompassing various organisms ranging from simple forms like sponges to more complex ones like insects and mollusks. Unlike vertebrates, which possess a backbone made of vertebrae, invertebrates do not have this structural feature. The use of "invertebrate" is essential in biology for classifying animals based on their physical characteristics and evolutionary history. This distinction is significant in understanding the diversity of life and the adaptations that different animal groups have developed over time. In contrast, the term "vertebrate" applies to animals that do have a backbone, while "mammal" refers to a specific class of vertebrates characterized by mammary glands, among other traits. "Crustacean" is a subclass of invertebrates that includes animals like crabs and shrimp, highlighting that while all crustaceans are invertebrates, not all invertebrates are crustaceans.

4. What term refers to the capability of an organism to produce viable offspring?

A. Fertility

B. Viability

C. Fecundity

D. Reproductivity

The term that accurately describes the capability of an organism to produce viable offspring is fertility. Fertility refers specifically to the ability to conceive and give birth to offspring, emphasizing the successful reproductive processes that lead to the creation of new individuals that can survive and thrive. This concept encompasses various biological factors, including the health of the reproductive system, genetic compatibility, and environmental influences that can affect reproductive outcomes. Other terms, while related, do not capture the essence of producing viable offspring as clearly. Viability refers more to the capability of an organism to survive and develop rather than the act of reproduction itself. Fecundity is often used to describe the potential reproductive capacity of an organism, usually indicating the number of eggs or seeds produced, while reproductivity is not a standard term in biology, making it less applicable in this context.

5. Which category of genetic information serves as a unit of heredity?

A. Chromosome

B. Protein

C. Gene

D. Amino acid

A gene is the correct answer because it serves as the fundamental unit of heredity. Genes are segments of DNA that carry the instructions for making proteins, which ultimately determine the traits and characteristics of an organism. Each gene is responsible for a specific function or trait, such as eye color, hair texture, or the ability to metabolize certain substances. Chromosomes are structures within cells that contain many genes, but they are not the basic unit of heredity themselves. Instead, they serve as the container that organizes and carries genes. Proteins, while essential for various functions in the body and made based on gene instructions, do not themselves carry hereditary information. Amino acids are the building blocks of proteins, but they do not contain genetic information either. Thus, while all the other options are related to genetics, only a gene directly serves as a unit of heredity.

6. What condition does hypertonic refer to in relation to cell environments?

A. Cell swelling due to excess water

B. Equal concentration of solutes

C. Lower concentration of solutes outside

D. Higher concentration of solutes outside

Hypertonic conditions refer to environments where there is a higher concentration of solutes outside the cell compared to the inside. In this scenario, when a cell is placed in a hypertonic solution, water moves out of the cell in an attempt to balance the concentration of solutes on both sides of the cell membrane. As a result, the cell loses water and may shrink or crenate. Understanding hypertonicity is crucial as it highlights the concept of osmosis—the movement of water across a semipermeable membrane in response to solute concentration differences. This principle is vital for applications in biology, such as understanding how cells maintain homeostasis and manage their internal environments.

7. Which variable in an experiment responds to changes in the independent variable?

A. Dependent Variable

B. Independent Variable

C. Control Variable

D. Constant Variable

The dependent variable is the factor in an experiment that is observed and measured to assess the effect of changes made to the independent variable. When you manipulate the independent variable to see how it affects the outcome, it is the dependent variable that reacts to those changes. For instance, if you were studying the impact of light on plant growth, the amount of growth (measured in height or biomass) would be the dependent variable, as it changes in response to the varying levels of light exposure, which is the independent variable. The other terms describe different roles in an experiment. The independent variable is what the experimenter changes to observe its effect. Control variables are factors that are kept constant to ensure that the experiment is fair and that any effects observed are due to the independent variable alone. Constant variables are similar to control variables in that they remain unchanged throughout the experiment. These roles are crucial for maintaining the integrity and reliability of the experimental process.

8. An animal that feeds on both plants and animals is referred to as what?

A. Herbivore

B. Carnivore

C. Omnivore

D. Predator

An animal that feeds on both plants and animals is termed an omnivore. Omnivores have a diverse diet that allows them to exploit a variety of food sources, which can contribute to their adaptability in different environments. This capability enables them to thrive in situations where either plant or animal food might be scarce, giving them an advantage over more specialized feeders like herbivores, which only consume plants, or carnivores, which exclusively eat meat. Examples of omnivores include humans, bears, and many birds, all of which can successfully incorporate both plant and animal matter into their diets.

9. What is the process called when two organisms evolve from a common ancestor as a result of different environments?

A. Divergent Evolution

B. Convergent Evolution

C. Gradualism

D. Adaptive Radiation

The process in which two organisms evolve from a common ancestor due to adaptations in response to differing environmental conditions is known as divergent evolution. This occurs when a species experiences various selective pressures that lead to the development of distinct traits and characteristics, ultimately resulting in the formation of new species. Divergent evolution often occurs when populations of the same species become geographically isolated or occupy different ecological niches. Over time, genetic variations accumulate as each population adapts to its unique environment, leading to modifications in morphology, behavior, and physiology. This concept is effectively illustrated through examples such as the various finch species on the Galápagos Islands, which have adapted to different food sources and habitats yet share a common ancestor. In contrast, convergent evolution describes how unrelated species develop similar traits due to comparable environmental pressures, while gradualism refers to the theory that species evolve through small, incremental changes over long periods. Adaptive radiation, while related to divergent evolution, specifically refers to the rapid evolution of multiple species from a common ancestor in response to the availability of different ecological niches, which may not always be the case with divergent evolution.

10. What term describes any animal of the phylum Chordata having a notochord?

A. Mammal

B. Chordate

C. Amphibian

D. Reptile

The term that describes any animal of the phylum Chordata having a notochord is "Chordate." Chordates are defined by the presence of a notochord, which is a flexible, rod-shaped structure that provides support. In vertebrates, such as mammals, amphibians, and reptiles, the notochord is typically replaced by the vertebral column (spine) during development, but its presence in the early stages is what categorizes these organisms within the Chordata phylum. Mammals, amphibians, and reptiles are subcategories of chordates; therefore, while they possess specific characteristics that define each class, the overarching term that encapsulates all animals with a notochord is Chordate. This distinction is essential for understanding classifications within the animal kingdom and recognizing the fundamental features that unify members of the phylum Chordata, regardless of their class.

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://vabiologysol.examzify.com

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