ACT Science Practice Exam (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

1. **What depth is likely to represent significant bending points for the concentration trends of dissolved gases?**

   A. 0 cm

   B. 5 cm

   C. 10 cm

   D. 15 cm

2. **What does the independent variable represent in an experiment?**

   A. The variable that remains unchanged throughout the experiment

   B. The variable that is measured in response to changes

   C. The variable that the researcher manipulates

   D. The overall outcome of the experiment

3. **What does a decrease in carbon dioxide levels lead to in aquatic environments?**

   A. Higher pH levels

   B. Lower oxygen availability

   C. Increased temperature

   D. Lower levels of sulfates

4. **What effect does increasing the speed of a bar magnet toward a coil have on the induced current?**

   A. It decreases the current

   B. It has no effect on the current

   C. It increases the current

   D. It causes the current to alternate

5. **What role does practice play in preparing for the ACT Science section?**

   A. It allows for memorization of scientific definitions

   B. It minimizes the need for understanding concepts

   C. It helps develop timing and familiarity with the question style

   D. It replaces the need for thorough study of science content

6. Which scientific principles are fundamental in defining Earth's geologic processes?

A. Gravity, electromagnetism, and thermodynamics

B. Plant biology, oceanography, and atmospheric science

C. Plate tectonics, erosion, and sedimentation

D. Quantum physics, genetics, and chemistry

7. Which device could produce a tiny spot of light on the screen?

A. Concave lens

B. Convex lens

C. Flat mirror

D. Opaque card

8. What is the result of ritualized contests among animals?

A. A stable dominance hierarchy

B. Biological altruism

C. Adaptive radiation

D. Instinctive behavior

9. What is the relationship between the depth of the ocean sediment and the concentration of dissolved gases?

A. Concentration increases with depth

B. Concentration decreases with depth

C. Concentration stays the same

D. Concentration varies randomly

10. What role do control groups play in experimental design?

A. They provide entertainment value for the research team

B. They allow for comparison against the experimental group

C. They eliminate any ethical concerns in experiments

D. They are used only for observational studies

Answers

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

Explanations

1. What depth is likely to represent significant bending points for the concentration trends of dissolved gases?

A. 0 cm

B. 5 cm

C. 10 cm

D. 15 cm

The depth that represents significant bending points for the concentration trends of dissolved gases is most likely found at around 10 cm. In aquatic environments, the distribution of dissolved gases such as oxygen and carbon dioxide is influenced by several factors, including temperature, pressure, and biological activity. At the surface (0 cm), gases from the atmosphere can easily dissolve in the water, leading to relatively high concentrations. As you move deeper, different processes, such as the respiration of aquatic organisms and the decomposition of organic matter, affect the concentration of these gases. By about 10 cm, the interplay between these processes can create pronounced changes in the concentration of dissolved gases, often leading to noticeable gradients, or bending points, in the concentration profiles. Beyond this depth, the exertion of pressure and potentially reduced light penetration can also impact gas solubility and biological activity, further influencing concentrations but often resulting in less sharp transitions. Therefore, it is the 10 cm depth that is typically significant in demonstrating the changes in dissolved gas concentrations due to those various aquatic processes.

2. What does the independent variable represent in an experiment?

A. The variable that remains unchanged throughout the experiment

B. The variable that is measured in response to changes

C. The variable that the researcher manipulates

D. The overall outcome of the experiment

In an experiment, the independent variable represents the factor that the researcher intentionally changes or manipulates to observe its effect on other variables. By altering this variable, researchers aim to determine how it influences the dependent variable, which is the one being measured. For instance, if a scientist is testing the impact of different amounts of sunlight on plant growth, the amount of sunlight is the independent variable because it is what the researcher controls or varies during the experiment. Understanding the role of the independent variable is crucial for establishing cause-and-effect relationships within scientific studies.

3. What does a decrease in carbon dioxide levels lead to in aquatic environments?

A. Higher pH levels

B. Lower oxygen availability

C. Increased temperature

D. Lower levels of sulfates

A decrease in carbon dioxide levels in aquatic environments results in higher pH levels due to a reduction in the concentration of carbonic acid, which is formed when carbon dioxide dissolves in water. When carbon dioxide levels drop, the equilibrium between carbonic acid (H_2CO_3) and bicarbonate (HCO_3^-) shifts, leading to less carbonic acid available to dissociate into hydrogen ions (H^+) and bicarbonate. Since pH is a measure of hydrogen ion concentration, a decrease in hydrogen ions from lower carbon dioxide results in a higher pH, indicating a more alkaline (less acidic) environment. The other options relate to different environmental factors that are not directly impacted by changes in carbon dioxide levels. For example, lower oxygen availability is typically associated with increased biological activity or decomposition but is not directly connected to carbon dioxide variations. Similarly, increased temperature is influenced by external environmental factors like sunlight and energy influx rather than directly by carbon dioxide levels. Lower levels of sulfates are also not a direct consequence of changes in carbon dioxide and are determined by other biological and geological processes. Thus, the increase in pH due to decreased carbon dioxide is a well-established chemical relationship in aquatic systems.

4. What effect does increasing the speed of a bar magnet toward a coil have on the induced current?

A. It decreases the current

B. It has no effect on the current

C. It increases the current

D. It causes the current to alternate

Increasing the speed of a bar magnet toward a coil enhances the induced current due to a principle known as electromagnetic induction. According to Faraday's law of electromagnetic induction, the magnitude of the induced electromotive force (EMF) in a closed circuit is proportional to the rate of change of magnetic flux through the circuit. When the magnet moves faster toward the coil, the magnetic field in the coil changes more rapidly. This rapid change in magnetic flux induces a larger voltage (or EMF) across the coil, which in turn results in a greater current flowing through the coil, assuming the resistance remains constant. Thus, as the speed of the bar magnet increases, the induced current correspondingly increases, making the correct response the increase in current based on this fundamental principle of electromagnetism.

5. What role does practice play in preparing for the ACT Science section?

A. It allows for memorization of scientific definitions

B. It minimizes the need for understanding concepts

C. It helps develop timing and familiarity with the question style

D. It replaces the need for thorough study of science content

Practice plays a crucial role in preparing for the ACT Science section by helping students develop effective timing and familiarity with the various question styles present on the exam. The ACT Science section is unique and requires not only a foundational understanding of scientific concepts but also the ability to analyze data, interpret graphs, and evaluate scientific arguments efficiently. By engaging in practice, students become accustomed to the types of questions asked, learn how to quickly dissect complex information, and improve their speed and accuracy under timed conditions. This familiarity can significantly enhance performance on test day, allowing students to approach each question with confidence and a strategy honed through repeated exposure.

6. Which scientific principles are fundamental in defining Earth's geologic processes?

A. Gravity, electromagnetism, and thermodynamics

B. Plant biology, oceanography, and atmospheric science

C. Plate tectonics, erosion, and sedimentation

D. Quantum physics, genetics, and chemistry

The selection of plate tectonics, erosion, and sedimentation as fundamental scientific principles in defining Earth's geologic processes is accurate because these concepts directly explain how the Earth's surface and its geological features evolve over time. Plate tectonics refers to the large-scale movement of the Earth's lithosphere, which is broken into tectonic plates. The interaction of these plates leads to numerous geological activities, such as earthquakes, volcanic eruptions, and the formation of mountains. This theory is crucial because it provides the framework for understanding the dynamic nature of Earth's crust and contributes significantly to the development of landforms. Erosion is the process by which materials from the Earth's surface are worn away and removed through various natural forces, including wind and water. This process shapes landscapes by influencing topography, soil formation, and sediment transport. Erosion is an essential aspect of the rock cycle and plays a vital role in how landforms change over time. Sedimentation involves the deposition of sediments, which occurs when particles from erosion settle in a new location, leading to the formation of sedimentary rocks. This process is essential for understanding how various geological formations develop and how they can reveal information about Earth's history. Together, these concepts illustrate the interconnectedness of various geological processes and their roles in shaping the

7. Which device could produce a tiny spot of light on the screen?

A. Concave lens

B. Convex lens

C. Flat mirror

D. Opaque card

A convex lens is the correct choice for producing a tiny spot of light on the screen. When light rays pass through a convex lens, the lens causes the rays to converge to a point. This is due to the curvature of the lens, which causes parallel rays of light to focus at a specific point known as the focal point. If the light source is small and positioned at or near the focal point of the lens, it will project a concentrated spot of light on the screen, allowing for a sharp and bright image. In contrast, a concave lens diverges light rays, spreading them out instead of focusing them. This results in a wider area of light distribution, not a concentrated spot. A flat mirror reflects light but does not converge or focus the light into a small point, thus failing to generate a tiny spot of light. An opaque card blocks light entirely, preventing any light from being produced or focused, and would not create a spot on the screen at all.

8. What is the result of ritualized contests among animals?

A. A stable dominance hierarchy

B. Biological altruism

C. Adaptive radiation

D. Instinctive behavior

Ritualized contests among animals often lead to the establishment of a stable dominance hierarchy. These contests allow animals to establish social rankings within a group without the need for severe physical confrontation. The behaviors exhibited during these contests are typically less harmful and serve to minimize injury, allowing the animals to demonstrate strength, skill, or fitness. When an animal wins a contest, it may gain access to resources such as food or mates, which reinforces its position in the hierarchy. This stability helps regulate social interactions and reduces the potential for conflict, as individuals understand their rank and the associated rights and responsibilities. This is particularly important in social species, where clear dominance hierarchies can promote group cohesion and facilitate cooperative behaviors. In contrast, biological altruism refers to behaviors that benefit others at a cost to oneself and does not directly relate to contests or hierarchies. Adaptive radiation describes the rapid evolution of diversely adapted species from a common ancestor, which does not pertain to social structures among animals. Instinctive behavior encompasses natural reactions or behaviors that do not necessarily result from contests or social rankings. Therefore, the result of ritualized contests is best captured by the formation of a stable dominance hierarchy.

9. What is the relationship between the depth of the ocean sediment and the concentration of dissolved gases?

A. Concentration increases with depth

B. Concentration decreases with depth

C. Concentration stays the same

D. Concentration varies randomly

The concentration of dissolved gases in ocean sediment generally decreases with depth due to several factors related to the physical conditions and biological processes occurring in the sediment layers. As depth increases, the sediment becomes denser, and the conditions change. At shallower depths, sediments are more influenced by surface processes, including photosynthesis by marine plants and the respiration of marine life, which can contribute to higher concentrations of certain gases, like oxygen and carbon dioxide, in the upper layers. As you move deeper, there is less biological activity, and the conditions are now influenced more by increased pressure and lower temperatures, which affect gas solubility. Furthermore, deeper sediment layers may also experience compaction and increased mineralization, leading to a reduction in the volume of pore space available for dissolved gases. This means that although gases may initially be present in higher concentrations in burrowing zones or sediments affected by organic decay, they become less concentrated as one studies deeper sediment layers where these processes are not as active. Hence, the relationship between the depth of the ocean sediment and the concentration of dissolved gases is characterized by a gradual decrease in concentration with increasing depth.

10. What role do control groups play in experimental design?

A. They provide entertainment value for the research team

B. They allow for comparison against the experimental group

C. They eliminate any ethical concerns in experiments

D. They are used only for observational studies

Control groups play a critical role in experimental design by serving as a baseline for comparison against the experimental group. The experimental group is exposed to a variable being tested, while the control group does not receive this exposure. This setup allows researchers to isolate the effects of the variable being studied and determine if any observed changes in the experimental group can be directly attributed to that variable rather than other factors. By comparing results from the control group with those from the experimental group, scientists can assess the impact and significance of the treatment or manipulation applied to the experimental group. This comparison is essential for drawing valid conclusions about the effectiveness or influence of the independent variable in question. Without a control group, it would be challenging to infer whether the outcomes were caused by the test conditions or occurred due to random variation or other external influences.

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://actscience.examzify.com

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