

Ohio Assessment for Educators (OAE) Integrated Science (024) Practice Exam (Sample)

Study Guide



Everything you need from our exam experts!

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Table of Contents

Copyright	1
Table of Contents	2
Introduction	3
How to Use This Guide	4
Questions	5
Answers	8
Explanations	10
Next Steps	16

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 is the dominant inheritance pattern associated with Huntington's disease?**
 - A. Homozygous recessive**
 - B. Heterozygous**
 - C. Homozygous dominant**
 - D. Autosomal recessive**
- 2. What type of inheritance is described by an autosomal dominant disease?**
 - A. Heterozygous inheritance**
 - B. Homozygous recessive inheritance**
 - C. Homozygous autosomal dominant inheritance**
 - D. X-linked inheritance**
- 3. Which phenomenon leads to unusually dry weather in southern Africa?**
 - A. El Nino Effect**
 - B. La Nina Effect**
 - C. Geostrophic Balance**
 - D. Wind Shear**
- 4. What happens to the volume of a gas when pressure increases at constant temperature?**
 - A. It decreases**
 - B. It increases**
 - C. It remains the same**
 - D. It becomes infinite**
- 5. What type of mixture is characterized by particles that remain suspended?**
 - A. Solution**
 - B. Colloid**
 - C. Suspension**
 - D. Emulsion**

- 6. What is cystic fibrosis classified as in terms of genetics?**
- A. Heterozygous dominant disease**
 - B. Homozygous recessive disease**
 - C. Autosomal dominant disease**
 - D. X-linked recessive disease**
- 7. What is the chemical formula for nitride?**
- A. N^{2-}**
 - B. N^{3-}**
 - C. N^{-3}**
 - D. NO_3^-**
- 8. Which operational variable does not affect gas pressure according to kinetic molecular theory?**
- A. Volume of the gas**
 - B. Temperature of the gas**
 - C. Amount of gas present**
 - D. Color of the gas**
- 9. The eyes of an octopus and the eyes of humans are an example of which type of evolution?**
- A. Divergent evolution**
 - B. Convergent evolution**
 - C. Parallel evolution**
 - D. Adaptive evolution**
- 10. How often does a solar eclipse occur?**
- A. Once every month**
 - B. Every 6 months**
 - C. Twice a year**
 - D. Every year**

Answers

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

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Explanations

1. What is the dominant inheritance pattern associated with Huntington's disease?

- A. Homozygous recessive
- B. Heterozygous
- C. Homozygous dominant**
- D. Autosomal recessive

Huntington's disease is primarily associated with a dominant inheritance pattern, specifically because it is caused by a mutation in a single gene located on an autosome. In this case, the disorder arises when an individual has just one copy of the mutated gene, which is found in the dominant form. This means that individuals who are heterozygous, carrying one normal allele and one mutated allele, will express the disease, regardless of the presence of the normal allele. Furthermore, because it is an autosomal dominant condition, individuals do not need to inherit two copies of the mutant allele to manifest symptoms, as is the case with homozygous recessive or autosomal recessive traits. Thus, the correct understanding of this condition centers around the fact that having just one mutated allele—characteristic of the dominant inheritance pattern—is sufficient for the phenotypic expression of Huntington's disease.

2. What type of inheritance is described by an autosomal dominant disease?

- A. Heterozygous inheritance
- B. Homozygous recessive inheritance
- C. Homozygous autosomal dominant inheritance**
- D. X-linked inheritance

An autosomal dominant disease is characterized by the presence of a single copy of a mutant allele on one of the autosomes (non-sex chromosomes) that is sufficient to cause the disease. In this case, the inheritance pattern reflects that an individual only needs one affected allele from either parent to express the trait or disorder associated with that disease. When discussing "homozygous autosomal dominant inheritance," it is important to note that typically, the emphasis in autosomal dominant conditions is on being heterozygous (having one normal allele and one mutated allele) because that is usually the condition necessary for expressing the trait. However, in a strict sense, an individual can also be homozygous dominant (having two mutated alleles), which may lead to a more severe phenotype. While the dominant trait can usually manifest with just one mutated allele, the term "homozygous autosomal dominant inheritance" correctly describes the scenario where both alleles are affected, thereby reinforcing the dominant trait expression. This genetic framework is vital in understanding the transmission of certain diseases and traits, highlighting why an individual with even one dominant allele will exhibit the characteristic influenced by that allele. The correlation between disease presence and allele makeup is a key feature of this type of inheritance.

3. Which phenomenon leads to unusually dry weather in southern Africa?

- A. El Nino Effect**
- B. La Nina Effect**
- C. Geostrophic Balance**
- D. Wind Shear**

The phenomenon that leads to unusually dry weather in southern Africa is the El Niño Effect. During an El Niño event, the surface waters of the Pacific Ocean become warmer than average, which significantly impacts global weather patterns. In southern Africa, this warming affects the atmospheric circulation and can lead to changes in precipitation patterns, often resulting in below-average rainfall and drier conditions. While La Niña, which is characterized by cooler-than-average sea surface temperatures in the central and eastern Pacific, can influence weather patterns, its effects in southern Africa typically lead to wetter conditions rather than dry ones. Understanding the implications of different oceanic and atmospheric interactions, such as those seen in El Niño and La Niña phenomena, is crucial in predicting regional climate impacts.

4. What happens to the volume of a gas when pressure increases at constant temperature?

- A. It decreases**
- B. It increases**
- C. It remains the same**
- D. It becomes infinite**

When the pressure on a gas increases while keeping the temperature constant, the volume of the gas decreases in accordance with Boyle's Law. This law states that for a fixed amount of gas at a constant temperature, the pressure of the gas is inversely proportional to its volume. This means that as pressure goes up, the volume must go down to maintain that constant relationship, assuming no gas is added or removed from the system. This behavior can be visualized with a piston in a cylinder: if the piston is pressed down (increasing pressure), the space (or volume) the gas occupies must decrease. This principle is fundamental in understanding how gases behave under different conditions, making it essential in both scientific study and practical applications.

5. What type of mixture is characterized by particles that remain suspended?

A. Solution

B. Colloid

C. Suspension

D. Emulsion

The type of mixture characterized by particles that remain suspended is a colloid. In a colloid, the dispersed particles are larger than those found in a solution but smaller than those in a suspension, allowing them to remain evenly distributed without settling out over time. This characteristic is due to the size and interactions of the particles, which enables them to stay suspended rather than precipitating or separating from the liquid medium. Colloids can show unique properties, such as the Tyndall effect, where light is scattered by the suspended particles, making colloidal mixtures appear cloudy. This is distinctly different from solutions, where solute particles are completely dissolved, or suspensions, where the larger particles can settle out upon standing. Emulsions, which are a specific type of colloid, typically involve mixtures of two immiscible liquids stabilized by an emulsifying agent. Therefore, the distinctive feature of a colloid is the ability of its particles to remain suspended, which is why it is the correct answer.

6. What is cystic fibrosis classified as in terms of genetics?

A. Heterozygous dominant disease

B. Homozygous recessive disease

C. Autosomal dominant disease

D. X-linked recessive disease

Cystic fibrosis is classified as a homozygous recessive disease because it is caused by mutations in the CFTR gene located on chromosome 7. For an individual to express the disease, they must inherit two copies of the mutated gene, one from each parent. This means that both alleles at the CFTR gene locus must be recessive for cystic fibrosis to manifest. Individuals who have one normal allele and one mutated allele are known as carriers; they do not exhibit symptoms of the disease but can pass the mutated allele to their offspring. Therefore, in the context of genetics, cystic fibrosis fits the criteria for a homozygous recessive condition, as it requires the presence of two copies of the mutated gene for the disease traits to appear. The other classifications mentioned, such as autosomal dominant or X-linked recessive, do not apply to cystic fibrosis due to the inheritance pattern associated specifically with this genetic condition.

7. What is the chemical formula for nitride?

- A. N^{2-}
- B. N^{3-}
- C. N^{3-}**
- D. NO_3^-

The chemical formula for nitride is represented by N^{3-} . This notation signifies that a nitride ion consists of a nitrogen atom that has gained three electrons, resulting in a negative charge of three. In ionic compounds, nitrogen typically forms nitride ions when it combines with metals or forms part of a compound with a positive charge, such as in metal nitrides. The presence of the three negative charges indicates that nitride has a high tendency to form ionic bonds, as it seeks to achieve stability by gaining electrons. Other options do not represent nitride correctly; for instance, N^{2-} and N^{3-} suggest different oxidation states or bonding scenarios not applicable to nitride in its typical ion form. NO_3^- represents the nitrate ion, which contains both nitrogen and oxygen and is not a simple nitride. Thus, N^{3-} accurately indicates the nature of a nitride ion.

8. Which operational variable does not affect gas pressure according to kinetic molecular theory?

- A. Volume of the gas
- B. Temperature of the gas
- C. Amount of gas present
- D. Color of the gas**

According to kinetic molecular theory, gas pressure is influenced by variables that directly impact the movement and collision of gas particles. These include the volume of the gas, the temperature, and the amount of gas present, as each factor influences how frequently and forcefully gas particles collide with the walls of the container. The color of the gas, however, does not have any effect on its pressure. Color is a property associated with how light interacts with the gas and does not influence the kinetic energy or motion of gas molecules. Therefore, it is correct to state that the color of the gas is the operational variable that does not affect gas pressure, as it does not alter the behavior or interactions of the molecules in a way that would impact pressure.

9. The eyes of an octopus and the eyes of humans are an example of which type of evolution?

- A. Divergent evolution
- B. Convergent evolution**
- C. Parallel evolution
- D. Adaptive evolution

The eyes of an octopus and humans serve as a prime example of convergent evolution, which occurs when different species independently evolve similar traits or features in response to similar environmental pressures or functions. In this case, both octopuses and humans have developed complex eyes that allow for advanced vision despite their very different evolutionary lineages. The similarity in eye structure and function highlights how different organisms can tackle the same ecological challenge—such as the need for effective vision—resulting in analogous adaptations, showcasing the concept of convergent evolution. This phenomenon illustrates that similar environmental conditions can lead to similar adaptations, even among species that are not closely related.

10. How often does a solar eclipse occur?

A. Once every month

B. Every 6 months

C. Twice a year

D. Every year

A solar eclipse occurs approximately two to five times a year; however, the occurrence of a total solar eclipse at any given location is much rarer, typically happening once every 375 years on average for a specific spot on Earth. The most accurate choice in the context of typical solar eclipse frequency is that they occur multiple times a year. While it may be tempting to think that a solar eclipse occurs somewhat regularly throughout the year, the alignment of the Earth, Moon, and Sun necessary for a solar eclipse to happen only aligns favorably for an eclipse a few times annually. If a choice indicates twice a year, it would capture the essence of regular solar eclipses observable from various locations around the globe. This is why the frequency choice focuses on around two eclipses as the most definitive and commonly understood answer.

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://oae-integratedscience-024.examzify.com>

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