

OHIO ASSESSMENTS FOR EDUCATORS (OAE) MIDDLE GRADES SCIENCE (OAE 029) PRACTICE EXAM (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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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. What is the primary function of ribosomes within a cell?**
 - A. Site of energy production
 - B. Site of protein synthesis
 - C. Site of DNA replication
 - D. Site of lipid synthesis
- 2. Which of the following is NOT a type of bond?**
 - A. Ionic bond
 - B. Covalent bond
 - C. Acoustic bond
 - D. Metallic bond
- 3. What process occurs when folded land cannot be bent any further?**
 - A. Folding
 - B. Subduction
 - C. Faulting
 - D. Compression
- 4. What is glycolysis primarily responsible for breaking down?**
 - A. Proteins
 - B. Fats
 - C. Carbohydrates and sugars
 - D. Nucleic acids
- 5. Which of the following phases of the Moon represents a quarter phase?**
 - A. Waning Gibbous
 - B. New Moon
 - C. First Quarter
 - D. Waxing Crescent
- 6. What is a nucleotide?**
 - A. A type of monomer for proteins
 - B. A building block of DNA or RNA
 - C. A type of fat molecule
 - D. An organelle involved in energy production

7. Which of the following is an equation for gravitational force?

- A. $F = ma$
- B. $F = mg$
- C. $F = 1/2mv^2$
- D. $F = dp/dt$

8. What is the role of a reactant in a chemical reaction?

- A. To analyze light absorption
- B. To initiate a separation process
- C. To act as a chemical agent
- D. To provide cooling in reactions

9. Which of the following organisms belong to the phylum Cnidaria?

- A. Flatworms
- B. Sea anemones
- C. Roundworms
- D. Vertebrates

10. What type of bond is formed when two atoms share electrons?

- A. Ionic bond
- B. Covalent bond
- C. Metallic bond
- D. Hydrogen bond

Answers

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

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Explanations

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1. What is the primary function of ribosomes within a cell?

- A. Site of energy production
- B. Site of protein synthesis**
- C. Site of DNA replication
- D. Site of lipid synthesis

Ribosomes play a crucial role in the cell as the sites of protein synthesis. They are made up of ribosomal RNA (rRNA) and proteins, and they facilitate the translation process where messenger RNA (mRNA) is decoded to build polypeptides, which then fold into functional proteins. This process is essential for the cell's function because proteins are necessary for a variety of cellular activities, including enzymatic reactions, structural functions, and signaling processes. Understanding the role of ribosomes emphasizes their significance in the overall cellular machinery, as all cellular functions rely on proteins. This highlights the central dogma of molecular biology, where DNA is transcribed into RNA, which is translated into proteins. Therefore, selecting the function of ribosomes as sites of protein synthesis accurately reflects their critical contribution to maintaining life processes within the cell.

2. Which of the following is NOT a type of bond?

- A. Ionic bond
- B. Covalent bond
- C. Acoustic bond**
- D. Metallic bond

The choice identified as the correct answer, which is "Acoustic bond," is accurate because it does not represent a type of chemical bond. In chemistry, bonds are primarily classified into three categories: ionic bonds, covalent bonds, and metallic bonds. Ionic bonds occur when electrons are transferred from one atom to another, creating charged ions that are attracted to each other. Covalent bonds form when two atoms share one or more pairs of electrons, allowing both atoms to achieve a more stable electron configuration. Metallic bonds involve the pooling of electrons in a "sea" of electrons that are shared across a lattice of metal atoms, contributing to properties like electrical conductivity and malleability. In contrast, an "acoustic bond" is not recognized in this context. Acoustic phenomena pertain to sound waves and their propagation through different mediums, rather than interactions between atoms or molecules. Therefore, the term "acoustic bond" does not belong in the categorization of chemical bonding, confirming its status as the option that does not fit.

3. What process occurs when folded land cannot be bent any further?

- A. Folding
- B. Subduction
- C. Faulting**
- D. Compression

When folded land cannot be bent any further, faulting occurs. This process involves the breaking and displacement of rock layers along a fault line, which can result when the stress applied to the rock exceeds its strength. This can happen after extensive folding, when the geological structures have reached their limits for deformation. Faulting is characterized by noticeable shifts in the earth's crust, which can lead to earthquakes and the formation of new geological structures. In contrast, folding refers to the bending of rock layers due to tectonic forces, while subduction involves one tectonic plate being pushed under another, and compression is the force that causes the rocks to bend or break in the first place. Understanding these processes is key in geology, particularly when studying how the earth's landscape evolves due to tectonic activity and stress over time.

4. What is glycolysis primarily responsible for breaking down?

- A. Proteins
- B. Fats
- C. Carbohydrates and sugars**
- D. Nucleic acids

Glycolysis is a metabolic pathway that primarily breaks down carbohydrates and sugars to produce energy for the cell. This process occurs in the cytoplasm of cells and involves the conversion of glucose, a simple sugar, into pyruvate, while generating a small amount of ATP (adenosine triphosphate) and NADH (nicotinamide adenine dinucleotide). Glycolysis is the first step in cellular respiration and is crucial for organisms, as it provides the necessary energy for various cellular processes. The focus on carbohydrates and sugars highlights the essential role glycolysis plays in energy production, especially in scenarios where oxygen is limited or absent, allowing cells to extract energy efficiently from these macronutrients.

5. Which of the following phases of the Moon represents a quarter phase?

- A. Waning Gibbous
- B. New Moon
- C. First Quarter**
- D. Waxing Crescent

The First Quarter phase of the Moon occurs when half of the Moon's surface that faces Earth is illuminated by the Sun and appears as a half-circle. This phase occurs about a week after the New Moon, as the Moon moves in its orbit and more of its surface becomes visible. During this phase, the Moon is positioned at a 90-degree angle relative to the Earth and Sun, which leads to the characteristic appearance of being half-lit. In contrast, the other phases mentioned do not represent a quarter phase. The Waning Gibbous occurs after the Full Moon and has more than half of its face illuminated but is decreasing in brightness. The New Moon occurs when the Moon is located between the Earth and Sun and is not visible from Earth, representing a phase with zero illumination. The Waxing Crescent occurs before the First Quarter, with less than half of the Moon's illuminated surface visible as it transitions from New Moon toward the First Quarter. Thus, the First Quarter is specifically defined as the quarter phase of the lunar cycle.

6. What is a nucleotide?

- A. A type of monomer for proteins
- B. A building block of DNA or RNA**
- C. A type of fat molecule
- D. An organelle involved in energy production

A nucleotide is a fundamental building block of DNA and RNA, which are essential molecules in the storage and transmission of genetic information in living organisms. Each nucleotide consists of three components: a nitrogenous base, a five-carbon sugar (ribose in RNA and deoxyribose in DNA), and one or more phosphate groups. In the structure of DNA and RNA, nucleotides join together to form long chains, allowing for the combination of sequences that code for proteins and other biological functions. The specific sequence of these nucleotides encodes the genetic information that dictates an organism's traits and functions. Understanding the role of nucleotides is crucial in genetics, molecular biology, and biochemistry, as they are vital for processes such as DNA replication, transcription, and translation.

7. Which of the following is an equation for gravitational force?

- A. $F = ma$
- B. $F = mg$**
- C. $F = 1/2mv^2$
- D. $F = dp/dt$

The equation for gravitational force is defined as $F = mg$, where F represents the gravitational force, m is the mass of the object, and g is the acceleration due to gravity, typically approximated as 9.81 m/s^2 on the surface of the Earth. This equation expresses how the force experienced by an object is directly proportional to its mass and the constant acceleration of gravity. In this context, the gravitational force acts as a pulling force that attracts two masses together, with the mass of the Earth being one of the masses involved in this interaction. Understanding this relationship is crucial in physics, as it allows for the calculation of the weight of an object, which is essentially the force of gravity acting on it. The other options involve different physical concepts or laws, which do not represent gravitational force specifically. For instance, $F = ma$ is Newton's second law for any force resulting from acceleration, while $F = 1/2mv^2$ relates to kinetic energy, and $F = dp/dt$ describes the change in momentum over time.

8. What is the role of a reactant in a chemical reaction?

- A. To analyze light absorption
- B. To initiate a separation process
- C. To act as a chemical agent**
- D. To provide cooling in reactions

The role of a reactant in a chemical reaction is to act as a chemical agent. Reactants are the starting substances that undergo transformation during a chemical reaction. They interact with each other in a way that breaks chemical bonds, resulting in the formation of products through a rearrangement of atoms. This interaction is essential for driving the reaction forward and changing the forms of substances involved. While light absorption pertains to photochemical reactions and is important in understanding energy transfers, it does not define the role of a reactant. Similarly, initiating a separation process and providing cooling are not innate functions of a reactant but rather could be secondary outcomes or characteristics in specific scenarios. The fundamental characteristic of a reactant is its participation in the reaction itself, which is why its definition as a chemical agent is most appropriate in this context.

9. Which of the following organisms belong to the phylum Cnidaria?

- A. Flatworms
- B. Sea anemones**
- C. Roundworms
- D. Vertebrates

The organism that belongs to the phylum Cnidaria is the sea anemone. Cnidarians are characterized by their unique features, including the presence of specialized cells called cnidocytes, which house stinging structures used for defense and capturing prey. Sea anemones, along with jellyfish and corals, exhibit these key characteristics, making them true representatives of this phylum. In contrast, flatworms belong to the phylum Platyhelminthes, which are characterized by their flat bodies and lack of specialized respiratory and circulatory systems. Roundworms are part of the phylum Nematoda and possess a distinctly cylindrical body structure with a complete digestive system. Vertebrates belong to the phylum Chordata, defined by the presence of a backbone and a higher level of complexity. Thus, the sea anemone stands out as the sole representative from the phylum Cnidaria in this grouping.

10. What type of bond is formed when two atoms share electrons?

- A. Ionic bond
- B. Covalent bond**
- C. Metallic bond
- D. Hydrogen bond

A bond formed when two atoms share electrons is known as a covalent bond. This type of bond typically occurs between nonmetals, where each atom contributes at least one electron to the bond, resulting in a stable arrangement for both atoms. The shared electrons allow the atoms to achieve a fuller outer shell, often in accordance with the octet rule, which is critical for chemical stability. In contrast, ionic bonds involve the transfer of electrons from one atom to another, creating charged ions that attract each other due to their opposite charges. Metallic bonds, on the other hand, involve a "sea" of delocalized electrons that are shared among a network of metal atoms, giving rise to unique properties such as conductivity and malleability. Hydrogen bonds are a type of weak interaction that occurs between molecules, particularly with hydrogen atoms covalently bonded to electronegative atoms like oxygen or nitrogen, but they do not involve the sharing of electrons between atoms in the same way covalent bonds do.

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:

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

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