

CHEMISTRY AND SUSTAINABILITY CONCEPTS FOR STEM STUDENTS PRACTICE TEST (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. Which statement best describes why ice floats on water?**
- A. Ice is less dense than liquid water.
 - B. Ice is more dense than liquid water.
 - C. Ice has the same density as water.
 - D. Ice dissolves in water.
- 2. What is the deadline for achieving the SDGs?**
- A. 2025
 - B. 2030
 - C. 2040
 - D. 2050
- 3. Which factors influence the rate of a chemical reaction?**
- A. Concentration
 - B. Temperature
 - C. Catalysts
 - D. All of the above
- 4. Why is the interconnectedness of ecological systems important?**
- A. Decisions and actions in one ecological system can impact others, requiring coordinated efforts.
 - B. Interconnectedness means nothing about policy coordination.
 - C. Ecological systems are completely independent of human actions.
 - D. Interconnectedness eliminates the need for cross-system planning.
- 5. What does temperature measure?**
- A. The average kinetic energy of particles of matter
 - B. The total mass of the substance
 - C. The color of the substance
 - D. The speed of light in a vacuum

- 6. Which option best captures the impact of sustainability-focused industries?**
- A. They will improve living standards and positively impact the environment if they focus on sustainability.
 - B. They will worsen the environment.
 - C. They will improve living standards only if they ignore sustainability.
 - D. They will have no effect on living standards.
- 7. Which statement best defines sustainability?**
- A. Maximizing current resource extraction.
 - B. Meeting present needs without compromising the ability of future generations to meet their own needs.
 - C. Focusing on economic growth alone.
 - D. Preserving nature while ignoring social equity.
- 8. Which statement correctly defines a binary compound?**
- A. Contains many elements in random ratios.
 - B. Contains two different elements.
 - C. Contains only one element.
 - D. Contains three elements.
- 9. Who developed the atomic theory of matter?**
- A. Albert Einstein.
 - B. Niels Bohr.
 - C. Dmitri Mendeleev.
 - D. John Dalton.
- 10. How does air pressure change with altitude?**
- A. Air pressure increases with altitude.
 - B. Air pressure drops at higher altitudes.
 - C. Air pressure stays constant with altitude.
 - D. Air pressure varies randomly with no trend.

Answers

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

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Explanations

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1. Which statement best describes why ice floats on water?

- A. Ice is less dense than liquid water.
- B. Ice is more dense than liquid water.
- C. Ice has the same density as water.
- D. Ice dissolves in water.

The key idea here is density and buoyancy: something floats when its density is less than the liquid around it. Ice floats on water because the solid form is less dense than liquid water. When water freezes, water molecules arrange into a hexagonal lattice held by hydrogen bonds, creating more open space and a lower density (about 0.92 g/cm^3 for ice versus $\sim 1.00 \text{ g/cm}^3$ for liquid water at typical temperatures). Because ice is lighter per unit volume than the surrounding water, the buoyant force pushes it upward, causing it to float. If ice were denser than water, it would sink; if it had the same density, it would neither float nor sink distinctly. The idea isn't about dissolving; it's about how density differences drive buoyancy.

2. What is the deadline for achieving the SDGs?

- A. 2025
- B. 2030
- C. 2040
- D. 2050

The key idea is that the United Nations set a specific year as the horizon to finish the Sustainable Development Goals. In 2015, the UN adopted the 2030 Agenda for Sustainable Development, outlining 17 goals and many targets to be achieved by the year 2030. This deadline guides planning, tracking, and accountability across countries and organizations, providing a clear endpoint for progress. So, the deadline is 2030. The other years don't match the official target: 2025 would be too early for the full set of goals to be realized, while 2040 or 2050 extend beyond the designated horizon.

3. Which factors influence the rate of a chemical reaction?

- A. Concentration
- B. Temperature
- C. Catalysts
- D. All of the above

Rate depends on how often reacting molecules meet and how effectively those meetings lead to products. Increasing concentration raises how often collisions occur, speeding up the rate as there are more chances for reaction. Temperature shifts the kinetic energy distribution: at higher temperatures, more molecules have enough energy to surpass the activation energy, so more collisions are productive and the rate goes up. Catalysts provide an alternative, lower-energy pathway to products, allowing the reaction to proceed faster at the same temperature without being consumed. Since each of these factors can increase the rate, all of the listed factors influence how fast a reaction occurs.

4. Why is the interconnectedness of ecological systems important?

- A. Decisions and actions in one ecological system can impact others, requiring coordinated efforts.
- B. Interconnectedness means nothing about policy coordination.
- C. Ecological systems are completely independent of human actions.
- D. Interconnectedness eliminates the need for cross-system planning.

The main idea here is that ecological systems are linked and actions in one part of the environment can cascade into others. Because water, air, soils, plants, and animals all interact across landscapes, a decision or disturbance in one area can ripple through connected systems. For example, pollution or nutrient runoff in a watershed can travel downstream, affecting water quality, aquatic life, and even human communities that rely on that water. Changes in land use in one region can alter erosion, sedimentation, and habitat connectivity elsewhere, influencing species movement and ecosystem services like flood control and pollination. Because these linkages exist, solving environmental problems often requires coordinating actions across jurisdictions and sectors—agriculture, industry, urban planning, and conservation—so that policies in one area don't undermine efforts in another. That's why coordinated planning and cross-system collaboration are essential. Interconnectedness does not imply that policy coordination is irrelevant; quite the opposite: it highlights why coordination matters. Ecological systems are not completely independent of human actions, and interconnectedness does not remove the need for cross-system planning; it inherently creates the need for it.

5. What does temperature measure?

- A. The average kinetic energy of particles of matter
- B. The total mass of the substance
- C. The color of the substance
- D. The speed of light in a vacuum

Temperature tells us how fast the particles in a substance are moving on average, which means it reflects the average kinetic energy of those particles. As temperature increases, the average kinetic energy goes up, so particles jiggle more energetically. This is why hotter objects feel more energetic at the microscopic level. It's a per-particle measure, so two samples at the same temperature have the same average kinetic energy per particle, even if one sample has more particles and thus more total energy. Temperature isn't about how much matter there is (mass), color, or the speed of light, which is a constant unrelated to a substance's thermal motion.

6. Which option best captures the impact of sustainability-focused industries?

- A. They will improve living standards and positively impact the environment if they focus on sustainability.
- B. They will worsen the environment.
- C. They will improve living standards only if they ignore sustainability.
- D. They will have no effect on living standards.

Sustainability-focused industries aim to balance economic activity with environmental protection and social well-being, so their impact hinges on putting sustainable practices into action. When these industries prioritize efficiency, waste reduction, responsible resource use, and green job creation, they can raise living standards while also improving the environment through lower emissions, less pollution, and healthier ecosystems. That makes the best choice: living standards can improve and the environment can benefit, provided sustainability is actually pursued. If sustainability isn't prioritized, environmental harm can grow and living standards may not improve, and assuming no effect ignores how production and environmental health are connected.

7. Which statement best defines sustainability?

- A. Maximizing current resource extraction.
- B. Meeting present needs without compromising the ability of future generations to meet their own needs.**
- C. Focusing on economic growth alone.
- D. Preserving nature while ignoring social equity.

Sustainability means meeting present needs without compromising the ability of future generations to meet their own needs, by balancing environmental health, social equity, and economic viability. This intergenerational perspective is what makes it the best definition, emphasizing wise resource use, ecosystem protection, waste reduction, and the creation of resilient systems that endure over time. If we push to extract resources as quickly as possible, we deplete inputs and harm ecosystems, which undermines future options. Focusing only on economic growth ignores environmental costs and social impacts that are essential for long-term well-being. Preserving nature while ignoring fairness leaves people without access to resources or opportunities, which also undermines sustainability. So the statement that integrates present needs with future capabilities across the environmental, social, and economic dimensions best captures what sustainability means.

8. Which statement correctly defines a binary compound?

- A. Contains many elements in random ratios.
- B. Contains two different elements.**
- C. Contains only one element.
- D. Contains three elements.

Binary compounds consist of exactly two different elements joined together in a fixed ratio. The statement that it contains two different elements aligns with this idea, because a binary compound is defined by having two elements chemically bonded, such as NaCl or H₂O. The other descriptions describe mixtures or single-element species: having many elements in random ratios isn't a single compound of two elements, containing only one element isn't a compound of two elements, and containing three elements exceeds the two-element requirement.

9. Who developed the atomic theory of matter?

- A. Albert Einstein.
- B. Niels Bohr.
- C. Dmitri Mendeleev.
- D. John Dalton.**

The idea that matter is made of small, indivisible units called atoms and that chemical changes come from rearranging these atoms was first proposed by John Dalton. Dalton laid out a clear atomic theory in the early 1800s: matter is composed of atoms; atoms of the same element are identical in mass and properties; compounds form from simple, whole-number combinations of atoms; and in reactions, atoms are rearranged but not created or destroyed. This framework explains why elements combine in fixed proportions and underpins modern chemistry. Other famous scientists contributed important atomic-structure ideas—Albert Einstein helped establish quantum concepts, Niels Bohr proposed a model with quantized electron orbits, and Dmitri Mendeleev created the periodic table and predicted properties of unknown elements—but the development of atomic theory as a general explanation for matter is credited to Dalton.

10. How does air pressure change with altitude?

- A. Air pressure increases with altitude.
- B. Air pressure drops at higher altitudes.**
- C. Air pressure stays constant with altitude.
- D. Air pressure varies randomly with no trend.

Air pressure is the force from air molecules colliding with surfaces, created by the weight of the air column above you. As you rise, there is less air above to put weight on you, and the density of air also decreases, so collisions become less frequent. That combination makes pressure fall with increasing altitude. So the correct understanding is that air pressure drops at higher altitudes.

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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://chemsustainabilityforstemstudents.examzify.com>

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

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