

National Science Bee Practice Test (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

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- 1. Which group of compounds used in refrigerators and spray products can enter the atmosphere and destroy ozone?**
 - A. DDT**
 - B. Chlorofluorocarbons**
 - C. Neon**
 - D. Uranium**
- 2. In plant cells, which structure forms the rigid outer boundary?**
 - A. Cell Wall**
 - B. Cell Membrane**
 - C. Nucleus**
 - D. Chloroplast**
- 3. Dmitri Mendeleev based the arrangement of elements primarily on which property?**
 - A. Atomic weights**
 - B. Atomic numbers**
 - C. Electron configurations**
 - D. Ionization energy**
- 4. Which atmospheric layer is the outermost layer of Earth's atmosphere and gradually fades into space?**
 - A. Thermosphere**
 - B. Ionosphere**
 - C. Exosphere**
 - D. Mesosphere**
- 5. Which subatomic particle has no charge and is found in the nucleus of an atom?**
 - A. Electron**
 - B. Neutron**
 - C. Proton**
 - D. Positron**

- 6. Which geometric concept refers to a line that touches a circle at exactly one point?**
- A. Tangent**
 - B. Secant**
 - C. Chord**
 - D. Radius**
- 7. What is the name of the single landmass that broke apart 200 million years ago and gave rise to today's continents?**
- A. Pangaea**
 - B. Gondwana**
 - C. Laurasia**
 - D. Atlantis**
- 8. Which programming language is often used to write applications requiring performance and memory management?**
- A. Java**
 - B. C++**
 - C. Python**
 - D. Ruby**
- 9. A noble gas used in advertising signs because it glows when electrified is?**
- A. Ammonium**
 - B. Uranium**
 - C. DDT**
 - D. Neon**
- 10. Which subatomic particle carries a positive charge and is found in the nucleus of an atom?**
- A. Proton**
 - B. Electron**
 - C. Neutron**
 - D. Positron**

Answers

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

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Explanations

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1. Which group of compounds used in refrigerators and spray products can enter the atmosphere and destroy ozone?

A. DDT

B. Chlorofluorocarbons

C. Neon

D. Uranium

Ozone-depleting chemicals are those that can travel up to the stratosphere and participate in reactions that break down ozone. Chlorofluorocarbons are a group of compounds once common in refrigerators and spray products because they're stable in the lower atmosphere. But in the high-energy environment of the stratosphere, UV light breaks them apart and releases chlorine atoms. Those chlorine atoms set off catalytic cycles that convert ozone (O₃) into ordinary oxygen (O₂), and the chlorine atoms are regenerated to keep destroying more ozone. Because one chlorine atom can destroy many ozone molecules, even small releases lead to significant thinning of the ozone layer. This is why these compounds posed a major ozone issue before safer alternatives were adopted. Other options don't fit this mechanism: DDT is a pesticide, Neon is an inert gas, and Uranium is a radioactive element—none of which drive the ozone-depleting chemistry described.

2. In plant cells, which structure forms the rigid outer boundary?

A. Cell Wall

B. Cell Membrane

C. Nucleus

D. Chloroplast

The rigid outer boundary is formed by the cell wall. This tough layer sits outside the plasma membrane and is made mainly of cellulose, giving plant cells their shape and structural support. It helps resist internal water pressure from the vacuole, keeping the cell from bursting and helping the plant stand upright. The membrane inside the wall controls what enters and exits the cell, while the nucleus and chloroplasts have other roles related to genetics and photosynthesis, not boundary formation.

3. Dmitri Mendeleev based the arrangement of elements primarily on which property?

- A. Atomic weights**
- B. Atomic numbers**
- C. Electron configurations**
- D. Ionization energy**

Organizing the elements by increasing atomic weight is what Mendeleev used to create his periodic table. He observed that when elements were arranged by mass, their chemical properties appeared to repeat at regular intervals, which allowed him to group similar elements together and notice patterns across periods and groups. He even left gaps for elements that hadn't been discovered yet, predicting their properties based on these repeating trends. Atomic numbers, which reflect the number of protons, became the later standard after Moseley showed their importance, resolving some inconsistencies that mass alone couldn't explain. Electron configurations and ionization energy are important characteristics, but they weren't the organizing rule Mendeleev relied on. So the best answer is arranging the elements by atomic weight.

4. Which atmospheric layer is the outermost layer of Earth's atmosphere and gradually fades into space?

- A. Thermosphere**
- B. Ionosphere**
- C. Exosphere**
- D. Mesosphere**

Think about how Earth's atmosphere gradually blends into space. The layer at the very top is the exosphere, where the number of particles is incredibly small and the air just keeps thinning out until it fades into the vacuum of space. There isn't a sharp edge here—particles can travel long distances and some can even escape the planet's gravity. That gradual fading into space is the hallmark of the exosphere. Below it lies the thermosphere (which includes the ionosphere), then the mesosphere, each with higher particle densities and more defined boundaries.

5. Which subatomic particle has no charge and is found in the nucleus of an atom?

- A. Electron**
- B. Neutron**
- C. Proton**
- D. Positron**

In atoms, the nucleus is made up of protons and neutrons, while electrons orbit around outside the nucleus. The particle that has no electric charge and sits in the nucleus is the neutron. It contributes to the atom's mass and, together with protons, is held in the nucleus by the strong nuclear force. The other options don't fit: electrons are negatively charged and located outside the nucleus; protons are positively charged and reside in the nucleus; a positron is the antiparticle of the electron with a positive charge and isn't a standard constituent of the nucleus in ordinary atoms.

6. Which geometric concept refers to a line that touches a circle at exactly one point?

A. Tangent

B. Secant

C. Chord

D. Radius

A line that touches a circle at exactly one point is called a tangent. This touch point is the point of tangency, and the radius drawn to that point is perpendicular to the tangent line. If a line passes through the circle in two points, it's a secant. The line segment inside the circle joining two points on the circle is a chord, and a radius is the segment from the circle's center to a point on the circle. The tangent property—perpendicularity to the radius at the point of contact—helps distinguish it from the other ideas.

7. What is the name of the single landmass that broke apart 200 million years ago and gave rise to today's continents?

A. Pangaea

B. Gondwana

C. Laurasia

D. Atlantis

Pangaea was a supercontinent that gathered all the Earth's land together. It existed roughly 335 to 175 million years ago, and around 200 million years ago it began to rift apart, first forming the northern landmass Laurasia and the southern one Gondwana, which later separated into the continents we have today. The other names refer to later configurations or, in the case of Atlantis, a mythical place. So the name of the single landmass before the breakup is Pangaea.

8. Which programming language is often used to write applications requiring performance and memory management?

A. Java

B. C++

C. Python

D. Ruby

Performance and memory control are crucial when building software that must run fast and predictably. C++ lets you manage memory directly with explicit allocation and deallocation, and its RAII pattern ties resource lifetimes to object lifetimes, giving you deterministic destruction. This means you can control exactly when memory is freed and avoid unpredictable pauses, which is essential for performance-critical tasks. It also enables low-level access and fine-tuned optimizations, allowing you to control memory layout and CPU usage—perfect for areas like game engines, real-time systems, and performance-heavy libraries. Languages like Java rely on automatic memory management with a garbage collector, which can cause pauses and less precise control over memory timing. Python and Ruby are typically interpreted with higher overhead and dynamic typing, making them slower for CPU-intensive workloads. So, for applications demanding peak performance and tight memory management, C++ is the best fit.

9. A noble gas used in advertising signs because it glows when electrified is?

- A. Ammonium**
- B. Uranium**
- C. DDT**
- D. Neon**

Neon is the gas used in advertising signs because it glows when electricity passes through it. Neon is a noble gas, which means it's very stable and stays as a separate gas inside a sealed tube. When a high voltage energizes the gas, electrons collide with neon atoms and excite them to higher energy levels. As the atoms relax back down, they emit light at specific wavelengths, producing a bright glow. Neon signs are famous for their distinctive red-orange color, though other noble gases can create different colors. The other options aren't noble gases and don't produce this glowing glow in signage.

10. Which subatomic particle carries a positive charge and is found in the nucleus of an atom?

- A. Proton**
- B. Electron**
- C. Neutron**
- D. Positron**

The key idea is that the nucleus contains particles that carry charge, and only one of them has a positive charge. The positively charged constituent of the nucleus is the proton, which combines with neutrons to form the nucleus of every atom. Protons determine the element's identity through the atomic number. Electrons, which carry negative charge, sit outside the nucleus in orbit around it. Neutrons have no charge and also reside in the nucleus. A positron is the antiparticle of the electron and isn't a normal component of a typical atom's nucleus. So the particle that carries a positive charge and is found in the nucleus is the proton.

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://natlsciencebee.examzify.com>

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

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