Alberta Grade 9 Science PAT Practice Test (Sample)

Study Guide

Everything you need from our exam experts!

Table of Contents

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. **Which rock type is formed primarily by cooling and crystallization of molten rock?**

   A. Sedimentary

   B. Organic

   C. Metamorphic

   D. Igneous

2. **Which of the following is a recommended safety practice when handling unknown chemicals?**

   A. Sunglasses

   B. Flip flops

   C. No protection

   D. Safety goggles and gloves

3. **Ten carbon atoms correspond to which term?**

   A. Decacarbon

   B. Hexacarbon

   C. Pentacarbon

   D. Nonacarbon

4. **Approximately how many electrons are in one coulomb of electric charge?**

   A. 6.25 billion billion

   B. 6.25 billion

   C. 6.25 trillion

   D. 1.0 x 10^18

5. **Which of the following pairs are examples of limiting factors for population growth?**

   A. Oxygen and nitrogen

   B. Food availability and space

   C. Weather and climate

   D. Evaporation and condensation

6. Which statement describes how a chemical formula communicates composition of a compound?

A. It lists the types and numbers of atoms present in one molecule.

B. It shows the physical state of each element.

C. It indicates energy levels of the atoms.

D. It describes how elements combine to form isotopes.

7. Which of the following is NOT listed as a type of asexual reproduction in the material?

A. Sexual reproduction

B. Binary fission

C. Budding

D. Spore production

8. Which statement about plane mirrors is true?

A. The image is virtual and upright, and same size as the object

B. The image is real and inverted

C. Light is absorbed by the mirror

D. The image is formed by light that passes through the mirror

9. Define frequency and wavelength in a wave, and how are they related to the speed of the wave?

A. Frequency is cycles per second; wavelength is distance per cycle; speed = frequency ÷ wavelength

B. Frequency is cycles per second; wavelength is distance per cycle; speed = frequency × wavelength

C. Frequency is cycles per minute; wavelength is distance per cycle; speed = frequency × wavelength

D. Frequency measures amplitude; wavelength measures speed; speed = amplitude × frequency

10. Which of the following is listed as a similarity between all living things?

A. Are made of cells

B. Move using muscles

C. Have chloroplasts

D. Reproduce only sexually

Answers

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

Explanations

1. Which rock type is formed primarily by cooling and crystallization of molten rock?

A. Sedimentary

B. Organic

C. Metamorphic

D. Igneous

Rocks are classified by how they form. When molten rock from inside Earth cools and solidifies, its minerals crystallize and the rock becomes igneous. The cooling rate shapes the texture: slow cooling underground yields large crystals, as in granite; rapid cooling at the surface produces small crystals, as in basalt, or can create a glassy texture like obsidian. Sedimentary rocks form from deposited and cemented fragments, organic rocks come from accumulated plant or animal remains, and metamorphic rocks arise when existing rocks are reshaped by heat and pressure without melting. So the rock formed primarily by cooling and crystallization of molten rock is igneous.

2. Which of the following is a recommended safety practice when handling unknown chemicals?

A. Sunglasses

B. Flip flops

C. No protection

D. Safety goggles and gloves

Protecting eyes and skin with proper PPE is essential when handling unknown chemicals. Unknown substances can splash, irritate, or injure you, so having a barrier between you and the chemical is key. Safety goggles provide secure splash protection for the eyes, which sunglasses cannot offer, while gloves shield the skin on your hands from contact. Sunglasses, flip flops, or no protection give inadequate barriers and leave you vulnerable to chemical exposure and injuries. Wearing safety goggles and gloves directly addresses the main hazard by reducing exposure to unknown chemicals.

3. Ten carbon atoms correspond to which term?

A. Decacarbon

B. Hexacarbon

C. Pentacarbon

D. Nonacarbon

Understanding how numerical prefixes work helps here: deca- means ten. When you pair that prefix with carbon to name a molecule or group containing ten carbon atoms, you get decacarbon. The other options use smaller prefixes—hexacarbon would be six, pentacarbon five, and nonacarbon nine—so they don't match ten.

4. Approximately how many electrons are in one coulomb of electric charge?

A. 6.25 billion billion

B. 6.25 billion

C. 6.25 trillion

D. 1.0 x 10^18

The key idea is that charge comes from counting how many elementary charges (electrons) you stack together. An electron carries a charge of about 1.6 × 10^-19 coulombs. To find how many electrons make up 1 coulomb, divide the total charge by the charge per electron: N = 1 C / (1.6 × 10^-19 C per electron) ≈ 6.25 × 10^18 electrons. So one coulomb contains roughly 6.25 × 10^18 electrons, i.e., about 6.25 billion billion electrons. If the charge is negative, it's the same number of electrons, just with negative sign.

5. Which of the following pairs are examples of limiting factors for population growth?

A. Oxygen and nitrogen

B. Food availability and space

C. Weather and climate

D. Evaporation and condensation

In ecology, a limiting factor is something that prevents a population from growing beyond a certain size in a given environment. The most direct limiting factors are resources the population relies on to survive and reproduce, and the space available to live and find those resources. Food availability determines how much energy organisms have to grow, reproduce, and survive, while space (habitat) limits how many individuals can live and access those resources without excessive competition. Together, they constrain population size to the carrying capacity of the environment. The other options aren't as clear-cut as limiting factors for population growth. Oxygen and nitrogen are essential for life, but their availability isn't typically the primary factor that caps population size across most ecosystems. Weather and climate describe broad environmental conditions that influence survival, but they're not the direct resources being consumed. Evaporation and condensation are processes in the water cycle, not factors that directly limit how large a population can grow. So the pair that directly embodies limiting factors—resource and space limiting population size—is the one describing food availability and space.

6. Which statement describes how a chemical formula communicates composition of a compound?

A. It lists the types and numbers of atoms present in one molecule.

B. It shows the physical state of each element.

C. It indicates energy levels of the atoms.

D. It describes how elements combine to form isotopes.

The idea being tested is how a chemical formula communicates composition. A chemical formula communicates which elements are present and how many atoms of each are in one molecule or formula unit. For example, water written as H2O shows two hydrogen atoms and one oxygen atom in every molecule, conveying the exact makeup. The subscripts indicate counts, and the element symbols identify the types of atoms involved. The other statements don't describe composition. A physical state symbol or context isn't part of the basic formula itself, so it doesn't communicate what the substance is made of. Energy levels are described by electron configurations or diagrams, not by the formula. Isotopes concern different masses and may require special notation, but a standard formula focuses on which elements and how many atoms, not on isotopic identity.

7. Which of the following is NOT listed as a type of asexual reproduction in the material?

A. Sexual reproduction

B. Binary fission

C. Budding

D. Spore production

Asexual reproduction involves a single parent producing offspring without fertilization, so the offspring are typically genetically similar to the parent. In the material, binary fission, budding, and spore production are listed as examples of asexual reproduction. Sexual reproduction, by contrast, requires two gametes and genetic recombination, resulting in offspring with mixture of genetic material. Because it is not a method of asexual reproduction, sexual reproduction is the option not listed in the material.

8. Which statement about plane mirrors is true?

A. The image is virtual and upright, and same size as the object

B. The image is real and inverted

C. Light is absorbed by the mirror

D. The image is formed by light that passes through the mirror

In a plane mirror, the image you see is virtual, upright, and the same size as the object, and it appears behind the mirror at the same distance that the object is in front. This happens because light reflects off the flat surface with equal angles of incidence and reflection, and if you extend those reflected rays backward, they seem to come from a point behind the mirror. Since the rays don't actually converge to form a real image on a screen, it's virtual. The flat surface preserves size, so the magnification is 1, meaning the image is the same size as the object. Light isn't absorbed as the defining feature here; rather, most of it is reflected. And the image isn't formed by light passing through the mirror; in a typical plane mirror, light is reflected, not transmitted.

9. Define frequency and wavelength in a wave, and how are they related to the speed of the wave?

A. Frequency is cycles per second; wavelength is distance per cycle; speed = frequency ÷ wavelength

B. Frequency is cycles per second; wavelength is distance per cycle; speed = frequency × wavelength

C. Frequency is cycles per minute; wavelength is distance per cycle; speed = frequency × wavelength

D. Frequency measures amplitude; wavelength measures speed; speed = amplitude × frequency

The main idea is how frequency and wavelength determine the speed of a wave. Frequency is how often the wave repeats in a given time, measured in cycles per second (hertz). Wavelength is the distance over which one complete cycle repeats, measured in meters. The speed of a wave is how far its crests travel in one second, which comes from multiplying how many cycles occur each second by how far one cycle extends: speed = frequency × wavelength. For example, if a wave has a frequency of 2 cycles per second and a wavelength of 3 meters, its speed is 6 meters per second. Amplitude describes the height of the wave, not how fast it travels, and the frequency unit must be per second for the standard relation to hold.

10. Which of the following is listed as a similarity between all living things?

A. Are made of cells

B. Move using muscles

C. Have chloroplasts

D. Reproduce only sexually

All living things share the presence of cells as their basic building blocks. The idea behind cell theory is that cells are the fundamental units of life, and every organism is made of one or more cells, with new cells arising from existing ones. This explains why a wide range of life—from bacteria to plants to animals to fungi—fit under the same umbrella: their life processes occur within cells and rely on cellular organization. Other statements aren't universal for all living things: movement using muscles isn't found in every organism, chloroplasts are present only in photosynthetic organisms like plants and some algae, and many organisms can reproduce asexually, not just sexually.

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://albertagr9sciencepat.examzify.com

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