MICHIGAN TEST FOR TEACHER CERTIFICATION (MTTC) SECONDARY INTEGRATED SCIENCE PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

VISIT US ONLINE FOR THE FULL VERSION STUDY GUIDE

https://mttc-secondaryintegratedscience.examzify.com

Copyright © 2026 by Examzify - A Kaluba Technologies Inc. product.

ALL RIGHTS RESERVED.

No part of this book may be reproduced or transferred in any form or by any means, graphic, electronic, or mechanical, including photocopying, recording, web distribution, taping, or by any information storage retrieval system, without the written permission of the author.

Notice: Examzify makes every reasonable effort to obtain accurate, complete, and timely information about this product from reliable sources.

SAMPLE

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

SAMPLE

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.

SAMPLE

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!

SAMPLE

Questions

SAMPLE

1. **What is the main substance in seeds that provides nourishment during the early stages of growth?**

   A. Seed coat

   B. Endosperm

   C. Cotyledon

   D. Stigma

2. **During which phase of mitosis do chromosomes condense and the mitotic spindle begin to form?**

   A. Interphase

   B. Prophase

   C. Anaphase

   D. Telophase

3. **Which method of heat transfer occurs in a fluid through the movement of the fluid itself?**

   A. Radiation

   B. Convection

   C. Conduction

   D. Thermal expansion

4. **What are the basic requirements for life?**

   A. Heat and Light

   B. Food and Water, Sunlight and Air, Shelter and Space

   C. Energy and Materials

   D. Reproduction and Growth

5. **Which type of anatomical structures indicate a common ancestor?**

   A. Analogous anatomical structures

   B. Vestigial anatomical structures

   C. Homologous anatomical structures

   D. Functional anatomical structures

SAMPLE

6. What defines an era in geological time?

A. It is the shortest division of time

B. It is characterized by dominant plants and animals

C. It marks the complete extinction of all species

D. It is a time of widespread volcanic activity

7. Contour lines that extend to the edge of the map indicate what?

A. A flat area.

B. The edge of a body of water.

C. A steep decline.

D. A continuation of elevation beyond the map.

8. What role do enzymes play in chemical reactions?

A. They slow down reactions

B. They initiate digestion

C. They absorb heat

D. They speed up reactions

9. What is the primary consequence of a lethal dominant allele?

A. It can cause the early death of offspring

B. It leads to dominant expression in all genetic crosses

C. It cannot exist in a homozygous state

D. It only affects male offspring

10. What characterizes transverse waves?

A. They are parallel to the wave of motion

B. They are perpendicular to the wave of motion

C. They undergo refraction only

D. They cannot interfere with other waves

SAMPLE

Answers

SAMPLE

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

SAMPLE

Explanations

SAMPLE

1. What is the main substance in seeds that provides nourishment during the early stages of growth?

A. Seed coat

B. Endosperm

C. Cotyledon

D. Stigma

The endosperm is the main substance in seeds that provides essential nourishment during the early stages of growth. This structure is a nutrient-rich tissue formed during fertilization and is primarily composed of starches, proteins, and oils. It serves as an energy source for the developing embryo as it germinates and begins to grow into a new plant. The endosperm is critical in supporting the early lifecycle of the plant until it can produce its own food through photosynthesis. In contrast, the seed coat is the protective outer layer that encases the seed but does not contribute to nutrition. Cotyledons, which are often referred to as seed leaves, can also provide nourishment as they store food and facilitate early photosynthesis once the seed has germinated. However, the distinction is that the endosperm is specifically designed for initial nourishment after germination, making it vital for early growth. The stigma is part of the flower structure and does not relate to seed development or nourishment.

2. During which phase of mitosis do chromosomes condense and the mitotic spindle begin to form?

A. Interphase

B. Prophase

C. Anaphase

D. Telophase

During prophase, chromosomes condense and become visible under a microscope as distinct units. This is the phase where chromatin—the relaxed form of DNA—compacts into tightly coiled chromosomes. In addition to this, the mitotic spindle starts to form from the centrosomes, which are structures responsible for organizing the microtubules that will play a crucial role in separating the chromosomes during cell division. The spindle fibers generally extend from the centrosomes to the chromosomes to facilitate this separation. In contrast, during interphase, which occurs before mitosis, the cell is growing and preparing for division, but chromosomes are not yet condensed. Anaphase is characterized by the separation of sister chromatids and their movement toward opposite poles of the cell, while telophase involves the de-condensation of chromosomes and the formation of nuclear membranes around the separated sets of chromosomes. Thus, prophase is specifically marked by the condensation of chromosomes and the initiation of spindle formation.

SAMPLE

3. Which method of heat transfer occurs in a fluid through the movement of the fluid itself?

A. Radiation

B. Convection

C. Conduction

D. Thermal expansion

The correct answer is convection, which refers to the process of heat transfer within fluids (liquids and gases) due to the actual movement of the fluid. When a fluid is heated, it becomes less dense and rises, while cooler, denser fluid descends to take its place, creating a continuous circulation pattern. This movement facilitates the transfer of heat from the warmer parts of the fluid to the cooler parts, effectively distributing thermal energy throughout the entire fluid. This is distinct from the other methods of heat transfer. Radiation involves the transfer of heat through electromagnetic waves and does not require a medium, meaning it can occur in a vacuum. Conduction is the transfer of heat through direct contact between materials, typically in solids, where molecules pass their kinetic energy to adjacent molecules. Thermal expansion refers to the increase in volume of a material when it is heated, not a method of transferring heat. Understanding convection is crucial in many scientific fields, including meteorology, oceanography, and engineering, as it plays a significant role in various natural and man-made systems.

4. What are the basic requirements for life?

A. Heat and Light

B. Food and Water, Sunlight and Air, Shelter and Space

C. Energy and Materials

D. Reproduction and Growth

The basic requirements for life center around the essential resources organisms need to survive, grow, and reproduce. Food and water provide the necessary nutrients and hydration for biological processes. Sunlight is crucial for photosynthetic organisms, which convert light energy into chemical energy, serving as the foundation of food webs. Air, primarily composed of oxygen and carbon dioxide, is vital for respiration in many organisms. Shelter offers protection from environmental hazards and space allows organisms to engage in vital activities such as foraging and reproduction. While energy and materials, reproduction, and growth are all important aspects of biological life, they stem from the more fundamental needs of sustenance and environmental safety outlined in the selected answer. The integration of food, water, and sunlight highlights the interconnectedness of these components in supporting life, making this option comprehensive in terms of the basic needs for survival and thriving in ecosystems.

SAMPLE

5. Which type of anatomical structures indicate a common ancestor?

A. Analogous anatomical structures

B. Vestigial anatomical structures

C. Homologous anatomical structures

D. Functional anatomical structures

Homologous anatomical structures provide evidence of a common ancestor because they are similar in form and structure due to shared evolutionary origin, despite potentially serving different functions in modern organisms. For instance, the forelimbs of humans, whales, and bats exhibit similar bone structures; however, they have evolved to perform various functions such as grasping, swimming, and flying, respectively. This commonality in structure but diversity in function reflects how these species have diverged from a shared lineage over time. In contrast, analogous anatomical structures arise from convergent evolution, where different species independently evolve similar traits as adaptations to similar environments or functions, without sharing a recent common ancestor. Vestigial anatomical structures, though derived from ancestors and still present in current species, do not indicate common ancestry in the context of functional evolutionary adaptation—they are remnants that have lost their original function. Functional anatomical structures are often not indicative of common ancestry but rather describe how parts fit together to enable the organism's survival. Thus, homologous structures are the key indicators of common ancestry in the study of evolutionary biology.

6. What defines an era in geological time?

A. It is the shortest division of time

B. It is characterized by dominant plants and animals

C. It marks the complete extinction of all species

D. It is a time of widespread volcanic activity

An era in geological time is defined primarily by significant and widespread changes in the Earth's biosphere, which are often characterized by dominant plants and animals. These periods are established based on major events in Earth's history, such as mass extinctions or the emergence of distinct types of organisms. During an era, specific life forms thrive and significantly influence the planet's environment and geology. For example, the Mesozoic Era is known for the dominance of dinosaurs, while the Paleozoic Era features a rich diversity of marine life and early terrestrial plants. This biological prominence is crucial for distinguishing one era from another within the geological time scale. The other options do not accurately capture the essence of what defines an era. The shortest division of geological time is actually termed an "epoch," while the notion of complete extinction of all species would not be an accurate marker for an era since most eras encompass a variety of life forms and evolutionary developments. Lastly, while volcanic activity may occur during specific eras, it does not define the time period itself. Hence, the emphasis on dominant plants and animals provides the most accurate depiction of what characterizes an era.

SAMPLE

7. Contour lines that extend to the edge of the map indicate what?

A. A flat area.

B. The edge of a body of water.

C. A steep decline.

D. A continuation of elevation beyond the map.

When contour lines extend to the edge of a map, they signify that the elevation indicated by those lines continues beyond the limits of the map. This means that the geographic feature does not abruptly cease at the edge, but rather suggests that the same topographical conditions persist in the same direction beyond what is visible. This can occur in areas such as mountains or hills where elevation changes continually, as the contours represent lines of equal elevation across the landscape. A flat area would typically be represented by contour lines that are spaced far apart and that do not necessarily reach the edge. Similarly, the edge of a body of water is often indicated by a specific change in the contour pattern or a different marker altogether. A steep decline would be represented through closely spaced contour lines, indicating a rapid change in elevation, rather than merely reaching the map's edge.

8. What role do enzymes play in chemical reactions?

A. They slow down reactions

B. They initiate digestion

C. They absorb heat

D. They speed up reactions

Enzymes serve as biological catalysts that facilitate and accelerate chemical reactions within living organisms. They do this by lowering the activation energy required for reactions to occur, which means that the reactions can happen more quickly and efficiently at the physiological temperatures present in biological systems. Enzymes provide an alternative pathway for the reaction, increasing the rate at which reactants are converted into products without being consumed in the process. This vital role is essential in many biological functions, such as metabolism, where timely reactions are critical for maintaining homeostasis and overall health. While some processes may involve digestion or heat absorption, these are not the primary functions of enzymes. Enzymes primarily focus on increasing the speed of reactions, making them indispensable to life as they enhance the efficiency of biochemical processes.

9. What is the primary consequence of a lethal dominant allele?

A. It can cause the early death of offspring

B. It leads to dominant expression in all genetic crosses

C. It cannot exist in a homozygous state

D. It only affects male offspring

A lethal dominant allele primarily leads to the early death of offspring. Dominant alleles typically express their traits even when only one copy is present. In the case of a lethal dominant allele, if an offspring inherits one copy of that allele, it can disrupt essential biological processes, ultimately resulting in early mortality. While dominant alleles are generally expressed in all genetic crosses involving at least one dominant allele, this characteristic does not specifically relate to the lethal nature of the allele. The assertion that a lethal dominant allele cannot exist in a homozygous state suggests that if an individual were to inherit two copies of this lethal allele, they would not survive. Therefore, while this can be considered a feature of a lethal dominant trait, it is the immediate consequence of that allele causing death, often before birth or shortly after, that holds primary significance. The idea that a lethal dominant allele only affects male offspring is not accurate, as it can impact any offspring regardless of sex.

SAMPLE

10. What characterizes transverse waves?

A. They are parallel to the wave of motion

B. They are perpendicular to the wave of motion

C. They undergo refraction only

D. They cannot interfere with other waves

Transverse waves are characterized by their motion in which the particles of the medium move perpendicular to the direction of the wave propagation. This means that if the wave is traveling in a horizontal direction, the particles of the medium will move up and down or side to side. A classic example of this is waves on a string or electromagnetic waves, where the oscillation of the electric and magnetic fields occurs at right angles to the direction of energy transfer. In contrast, longitudinal waves, such as sound waves in air, involve particle movement that is parallel to the direction of wave motion. Additionally, the other options may imply incorrect characteristics of wave behavior. For instance, while waves can undergo refraction, this is not exclusive to transverse waves. Lastly, waves can indeed interfere with each other, whether they are transverse or longitudinal, which is a fundamental feature of wave mechanics.

SAMPLE

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://mttc-secondaryintegratedscience.examzify.com

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

SAMPLE