MSTEP SCIENCE 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

1. How do particle speeds differ among solid, liquid, and gas?

A. Solids have fast particle movement; liquids have moderate; gases have slow.

B. Solids have tightly packed particles with little movement; liquids have more movement and flow; gases have fast, random movement with lots of space between particles.

C. All states have the same particle movement regardless of state.

D. Solids have the least movement; liquids have similar movement; gases have no movement.

2. Which rock type forms when existing rocks are subjected to high heat and pressure, causing changes?

A. Sedimentary Rock

B. Igneous Rock

C. Metamorphic Rock

D. Limestone

3. Which statement best describes preserving biodiversity based on both intrinsic and utilitarian value?

A. Biodiversity has intrinsic value only.

B. Biodiversity should be preserved only for ecosystem services.

C. Biodiversity exists for its own sake and provides ecosystem services.

D. Biodiversity has intrinsic value and provides ecosystem services, and should be preserved.

4. Which process causes warm air to rise in a room?

A. Conduction

B. Convection

C. Radiation

D. Reflection

5. What is a hypothesis?

A. A guess based on random observation

B. A prediction based on background knowledge (If/Then statement)

C. The data you collect

D. The experiment's conclusion

6. Which law states that mass is conserved in chemical reactions?

A. Law of Conservation of Energy

B. Law of Gravity

C. Law of Conservation of Mass

D. Law of Thermodynamics

7. In an experiment, which of the following is kept constant to ensure a fair test?

A. Independent Variable

B. Dependent Variable

C. Control Variables

D. Constants

8. In a well-designed experiment, which term describes factors kept constant to isolate the effect of the independent variable?

A. The independent variable

B. The dependent variable

C. Controlled Variables

D. The measurement unit

9. Which variable is measured to determine the effect of the independent variable?

A. Control Variable

B. Dependent Variable

C. Independent Variable

D. Constant

10. What is an ecosystem service?

A. An ecosystem service.

B. A measurement of biodiversity.

C. A type of organism in an ecosystem.

D. A market price for natural resources.

Answers

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

Explanations

1. How do particle speeds differ among solid, liquid, and gas?

A. Solids have fast particle movement; liquids have moderate; gases have slow.

B. Solids have tightly packed particles with little movement; liquids have more movement and flow; gases have fast, random movement with lots of space between particles.

C. All states have the same particle movement regardless of state.

D. Solids have the least movement; liquids have similar movement; gases have no movement.

Particles move more freely as you go from solid to liquid to gas, because how closely they are packed and how much energy they have changes. In a solid, the particles are tightly packed and mostly stay in place, only vibrating a little, so their speeds are the smallest. In a liquid, they're less tightly held and can slide past each other, so they move more and can flow, giving higher speeds than in a solid. In a gas, particles are far apart and move rapidly in random directions, colliding often, which gives the highest speeds. The increasing space between particles from solid to liquid to gas matches the greater freedom of movement at higher speeds. Temperature also raises speeds across all states, especially in gases.

2. Which rock type forms when existing rocks are subjected to high heat and pressure, causing changes?

A. Sedimentary Rock

B. Igneous Rock

C. Metamorphic Rock

D. Limestone

When rocks are altered by high heat and pressure deep in the Earth, they undergo metamorphism and become metamorphic rocks. This process rearranges minerals and often changes texture without melting, producing rocks that may have a layered (foliated) appearance or a more uniform texture. That's exactly the scenario described—existing rocks changing form under heat and pressure. Shale can become slate, limestone can become marble, and granite can become gneiss, illustrating how the same original material can transform into different metamorphic forms under these conditions. Sedimentary rocks form from sediments that settle and are cemented together, so they aren't defined by heat and pressure changing existing rocks. Igneous rocks form from molten rock that cools and solidifies, a different process altogether. Limestone is an example of a sedimentary rock (made largely of calcium carbonate), though it can become marble if subjected to metamorphism.

3. Which statement best describes preserving biodiversity based on both intrinsic and utilitarian value?

A. Biodiversity has intrinsic value only.

B. Biodiversity should be preserved only for ecosystem services.

C. Biodiversity exists for its own sake and provides ecosystem services.

D. Biodiversity has intrinsic value and provides ecosystem services, and should be preserved.

Preserving biodiversity based on both intrinsic and utilitarian value means recognizing that species exist for their own sake and also provide essential benefits to ecosystems and people. Intrinsic value is the idea that living beings have worth independent of how useful they might be. Utilitarian value, or ecosystem services, includes pollination, nutrient cycling, water purification, climate regulation, and cultural or recreational benefits. The best statement combines these ideas, saying biodiversity exists for its own sake and provides ecosystem services, and should be preserved. This dual view explains why protecting biodiversity matters: we respect the right of species to exist while also recognizing the practical benefits their diversity provides, like crops that depend on pollinators, forests that store carbon, and ecosystems that recover better from disturbances.

4. Which process causes warm air to rise in a room?

A. Conduction

B. Convection

C. Radiation

D. Reflection

Convection is the process at work. When air is heated near a heat source, it becomes less dense than the surrounding cooler air, so it rises. As it rises, it cools, becomes denser, and sinks, creating a circular pattern called a convection current. In a room, this means warm air from a heater tends to rise toward the ceiling while cooler air moves in to take its place, sustaining the circulation. Conduction would transfer heat mainly by direct contact, warming nearby surfaces or air without creating the rising movement. Radiation transfers heat through waves from the source to objects, and doesn't by itself describe the vertical rise of air. Reflection is just the bouncing of waves and isn't a heat-transfer mechanism in this context.

5. What is a hypothesis?

A. A guess based on random observation

B. A prediction based on background knowledge (If/Then statement)

C. The data you collect

D. The experiment's conclusion

A hypothesis is an educated, testable prediction about how changing one thing will affect another. It usually links the variable you change (the independent variable) with the outcome you measure (the dependent variable) and is often written as an If/Then statement: If I change the independent variable, then the dependent variable will respond in a certain way, because of what I know about the system. This uses background knowledge and prior observations to make a claim you can check with experiments. It's not just a guess or the data you collect, and it's not the conclusion you reach after analyzing results. This kind of statement is exactly what a hypothesis is.

6. Which law states that mass is conserved in chemical reactions?

A. Law of Conservation of Energy

B. Law of Gravity

C. Law of Conservation of Mass

D. Law of Thermodynamics

Matter can't be created or destroyed in ordinary chemical reactions. The atoms you start with are the same atoms you end up with, just rearranged into new substances. Because of that, the total mass of the reactants equals the total mass of the products when the reaction occurs in a closed system. This idea is called the Law of Conservation of Mass, and it explains why careful weighing shows the same mass before and after a reaction under normal laboratory conditions. Other choices refer to energy, gravity, or thermal principles, which are different ideas; they don't specifically state that mass remains constant in chemical changes.

7. In an experiment, which of the following is kept constant to ensure a fair test?

A. Independent Variable

B. Dependent Variable

C. Control Variables

D. Constants

A fair test means keeping all other factors the same so that any observed effect comes only from what you purposely change. Those factors kept constant are the control variables. By holding things like temperature, light, water, soil type, or pot size constant, you prevent them from affecting the outcome, so changes in the measured result reflect the influence of the independent variable you're testing. For example, in a plant-growth study, you'd keep sunlight, water amount, soil, and pot size the same for all plants and vary only the fertilizer amount to see its effect. The dependent variable is what you measure, and the independent variable is what you change.

8. In a well-designed experiment, which term describes factors kept constant to isolate the effect of the independent variable?

A. The independent variable

B. The dependent variable

C. Controlled Variables

D. The measurement unit

In a well-designed experiment, factors kept constant are used to make sure that only the thing you change (the independent variable) is responsible for any observed effect. Those unchanging factors are called controlled variables. They're kept the same across all trials so they don't influence the outcome, allowing a clear link between the independent variable and the dependent variable. For example, if you're studying how fertilizer amount affects plant growth, you'd keep light, water, soil type, temperature, and pot size constant while varying only the fertilizer amount. The independent variable is what you deliberately change (fertilizer amount), the dependent variable is what you measure (plant growth), and the measurement unit is just the way you quantify the result (like centimeters or grams).

9. Which variable is measured to determine the effect of the independent variable?

A. Control Variable

B. Dependent Variable

C. Independent Variable

D. Constant

The key idea is that the variable you measure to see what happens when you change something else is the dependent variable. It shows the outcome of the experiment and depends on the independent variable, which is the one you deliberately change. For example, if you test how different amounts of sunlight affect how tall a plant grows, the plant height is the dependent variable while sunlight exposure is the independent variable. Control variables are kept constant to avoid influencing the results, and a constant is simply a value that doesn't change. So the measured outcome you look at to determine the effect is the dependent variable.

10. What is an ecosystem service?

A. An ecosystem service.

B. A measurement of biodiversity.

C. A type of organism in an ecosystem.

D. A market price for natural resources.

An ecosystem service is the benefit people receive from natural ecosystems through their processes. These benefits can be tangible, like clean water, food, medicine, and pollination of crops; they can also be regulatory, such as climate moderation, flood control, and pest management; they include supporting processes like nutrient cycling and soil formation; and they cover cultural benefits like opportunities for recreation and aesthetic enjoyment. This idea centers on what ecosystems provide for people, rather than on measuring biodiversity, identifying a type of organism, or assigning a market price to resources. That makes the option that names the concept itself the best answer.

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://mstepscience.examzify.com

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