# BIOLOGY AND EARTH SCIENCE – FORCES, MAGNETISM, MOON PHASES, MICROBIOMES, AND ECOSYSTEMS 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.

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# 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!

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# Questions

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**1. What is carrying capacity?**

A. The energy available in the ecosystem.

B. The total number of species in the ecosystem.

C. The average lifespan of individuals.

D. The maximum population size an environment can sustain indefinitely with resources.

**2. What term means living things, such as plants, animals, and bacteria?**

A. Bacteria

B. Organisms

C. Microbiome

D. Population

**3. Which statement correctly contrasts 16S rRNA sequencing and metagenomic sequencing?**

A. 16S sequences all DNA; metagenomics targets a single gene.

B. 16S targets bacterial taxonomy via a single gene; metagenomics sequences all genetic material to assess taxonomy and functions.

C. 16S measures protein expression; metagenomics measures RNA transcripts.

D. 16S uses metagenomics; metagenomics uses proteomics.

**4. Which term describes a mechanism that breaks down organic matter and returns nutrients to the environment?**

A. Predator

B. Producer

C. System

D. Decomposer

**5. A population that eats organisms from another population.**

A. Predator population

B. Resource population

C. Consumer population

D. Food web

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**6. Which phase comes after New Moon in the standard sequence?**

A. Full Moon

B. Waxing Crescent

C. Waning Crescent

D. Waxing Crescent

**7. Which term describes two populations using the same resource?**

A. Resource population

B. Competition

C. Molecule

D. Consumer population

**8. State Lenz's law.**

A. Induced emf is independent of coil orientation.

B. The direction of the induced current opposes the change in magnetic flux.

C. The magnitude of induced current is proportional to the magnetic flux.

D. The induced current always flows clockwise.

**9. A 5 N force acts to the right on a 2 kg block, and a 3 N force acts to the left. What is the net force and the resulting acceleration?**

A. 2 N to the right; 1 m/s^2 to the right.

B. 8 N to the left; 4 m/s^2 to the left.

C. 2 N to the left; 1 m/s^2 to the left.

D. 0 N; 0 m/s^2.

**10. Which description best matches ecological succession?**

A. The progressive change in species composition of a community over time after a disturbance.

B. The daily weather-driven population changes.

C. A random pattern of population fluctuations.

D. An instantaneous restoration after a disturbance.

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# Answers

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

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# Explanations

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## 1. What is carrying capacity?

A. The energy available in the ecosystem.

B. The total number of species in the ecosystem.

C. The average lifespan of individuals.

D. The maximum population size an environment can sustain indefinitely with resources.

*Carrying capacity is the maximum population size an environment can sustain indefinitely with available resources. It reflects the point at which births and deaths balance over the long term due to limits like food, water, shelter, space, and waste buildup. As a population grows toward this limit, resources become scarcer, so the growth rate slows and the population tends to level off. If conditions improve (more food, better habitat) the carrying capacity can rise; if they worsen (drought, habitat loss) it can fall. This concept helps explain why populations don't grow forever—there's a limit set by the environment's ability to support them. For example, deer in a forest can increase their numbers until the deer population consumes too much vegetation; then resource scarcity slows growth and stabilizes the population at or near the carrying capacity. The other options don't fit because carrying capacity isn't about the energy available in the ecosystem in a general sense, the total number of species, or the average lifespan of individuals. It specifically describes the sustained limit on how many individuals an environment can support over time given its resources and conditions.*

## 2. What term means living things, such as plants, animals, and bacteria?

A. Bacteria

B. Organisms

C. Microbiome

D. Population

*Organisms are living things that carry out life processes, and that includes plants, animals, and bacteria. This term is broad enough to cover every individual life form, no matter what type it is. It's the best answer because it isn't limited to a single group or to a natural community. Bacteria refers to one type of living thing, not all living things. A microbiome is the community of microorganisms in a specific environment, not the living things themselves. A population describes how many individuals of a species live in an area, focusing on number rather than the general category of life.*

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**3. Which statement correctly contrasts 16S rRNA sequencing and metagenomic sequencing?**

A. 16S sequences all DNA; metagenomics targets a single gene.

B. 16S targets bacterial taxonomy via a single gene; metagenomics sequences all genetic material to assess taxonomy and functions.

C. 16S measures protein expression; metagenomics measures RNA transcripts.

D. 16S uses metagenomics; metagenomics uses proteomics.

*The key idea here is what each sequencing approach actually captures and what information it provides about a microbial community. 16S rRNA sequencing targets the 16S ribosomal RNA gene, using it as a marker to identify and classify bacteria (and some archaea) based on variations in that single gene. It acts like a barcode for who is present, giving taxonomic composition but not direct information about what those organisms can do. It doesn't sequence the entire genome, so it misses functional potential and non-bacterial members, and it can be biased by primer choice and gene copy number differences. Metagenomic sequencing, by contrast, sequences all the genetic material in a sample (shotgun approach). This broadens the view to include a mix of organisms and, importantly, lets you infer functional capabilities by identifying genes and pathways, not just who is there. You can glimpse both taxonomy and the functional potential of the community because you're looking at many genes across genomes. So the statement that correctly contrasts the two is that 16S targets bacterial taxonomy via a single gene, while metagenomics sequences all genetic material to assess taxonomy and functions. The other options misstate what each method sequences or what information it yields, such as claiming 16S sequences all DNA, or that 16S measures protein expression or RNA transcripts, or that one method uses the other.*

**4. Which term describes a mechanism that breaks down organic matter and returns nutrients to the environment?**

A. Predator

B. Producer

C. System

D. Decomposer

*Decomposition is the process by which dead material and waste are broken down by decomposers such as bacteria, fungi, and detritivores. These organisms digest the complex organic molecules in leaves, dead animals, and other matter and release nutrients like nitrogen, phosphorus, and minerals back into the soil and water. This recycling of nutrients keeps ecosystems functioning because plants can absorb those nutrients again to grow, sustaining the food web. A predator, by contrast, hunts and eats living prey, which influences population sizes and energy flow but doesn't primarily recycle nutrients. A producer is an organism, like a plant, that makes organic matter from inorganic sources using light or chemical energy, kick-starting energy flow but not breaking down waste. A system is a general term for a set of interacting parts and doesn't specify the nutrient-recycling role. The decomposer is the component that completes the cycle by breaking down material and returning nutrients to the environment.*

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## 5. A population that eats organisms from another population.

A. Predator population

B. Resource population

C. Consumer population

D. Food web

*The main idea here is understanding ecological roles in feeding relationships. When a population gains energy by eating organisms from another population, it is performing the role of a consumer. A consumer is any population that feeds on other organisms, not just those that hunt in a particular way. A predator is a type of consumer that kills and eats prey, but the broader term that fits the description "a population that eats organisms from another population" is a consumer population. The other options don't fit: a resource population is what is being consumed, not the eater; a food web is the network of feeding relationships, not a single population.*

## 6. Which phase comes after New Moon in the standard sequence?

A. Full Moon

B. Waxing Crescent

C. Waning Crescent

D. Waxing Crescent

*The Moon's illuminated portion grows after a New Moon, so you first see a thin crescent on the right side as illumination increases. That stage is called a waxing crescent. Waxing means increasing illumination, while waning means decreasing illumination. The Full Moon appears much later when the Moon is more than half illuminated, and Waning Crescent describes the thin crescent seen as illumination decreases toward the next New Moon. So the phase right after New Moon is the waxing crescent.*

## 7. Which term describes two populations using the same resource?

A. Resource population

B. Competition

C. Molecule

D. Consumer population

*When two populations rely on the same resource, they compete for it because resources are limited and both groups want to use them. This interaction is called competition, and it can happen between different species (interspecific) or within the same species (intraspecific). Competition can influence how large each population gets, how fast it grows, and where it can live. The other options don't describe this interaction: a resource population isn't a standard term for using a resource; a molecule is just a chemical unit; a consumer population refers to organisms that eat others, not the act of two populations sharing a resource.*

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## 8. State Lenz's law.

A. Induced emf is independent of coil orientation.

B. The direction of the induced current opposes the change in magnetic flux.

C. The magnitude of induced current is proportional to the magnetic flux.

D. The induced current always flows clockwise.

*Lenz's law tells us that the induced current flows in a way that opposes the change in magnetic flux through the circuit. In practical terms, the induced emf is proportional to the negative rate of change of the magnetic flux: emf = -dΦ/dt. So if the magnetic flux through a loop is increasing, the induced current produces a magnetic field that opposes that increase. If the flux is decreasing, the induced current reverses to oppose the decrease. This is why the direction of the induced current depends on how the flux is changing and not fixed to always be clockwise or counterclockwise.*

## 9. A 5 N force acts to the right on a 2 kg block, and a 3 N force acts to the left. What is the net force and the resulting acceleration?

A. 2 N to the right; 1 m/s^2 to the right.

B. 8 N to the left; 4 m/s^2 to the left.

C. 2 N to the left; 1 m/s^2 to the left.

D. 0 N; 0 m/s^2.

*The key idea is that the net force is the sum of all forces with direction taken into account, and acceleration follows from Newton's second law. With a 5 N push to the right and a 3 N push to the left, the forces oppose each other, so you subtract: 5 N − 3 N = 2 N, and the net force points to the right. Then apply a = F_net / m. With a mass of 2 kg, the acceleration is a = 2 N / 2 kg = 1 m/s^2 to the right. So the correct result is a net force of 2 N to the right and an acceleration of 1 m/s^2 to the right. If the forces were equal, they would cancel and the acceleration would be zero, which is not the case here.*

## 10. Which description best matches ecological succession?

A. The progressive change in species composition of a community over time after a disturbance.

B. The daily weather-driven population changes.

C. A random pattern of population fluctuations.

D. An instantaneous restoration after a disturbance.

*Ecological succession is a gradual, directional change in the species composition and structure of a community over time following a disturbance or creation of new habitat. After a disturbance, pioneer species establish and modify the environment, allowing other species to move in, with successive communities forming until a more stable climax community is reached. This process unfolds over years to centuries as soils develop and species interactions shift. It is not about daily weather-driven population changes, nor a random pattern of fluctuations, nor an instantaneous restoration after disturbance.*

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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:

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

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