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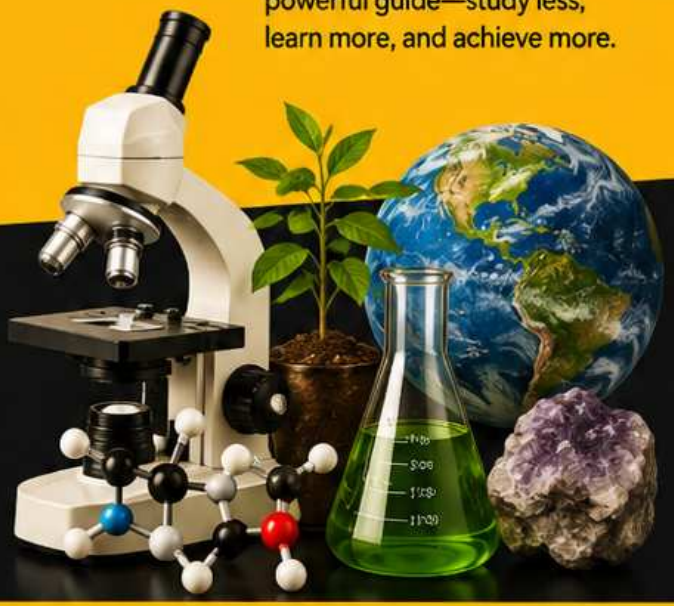
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Beginner Guide

CLEP

Natural Sciences

for Beginners

The Ultimate Step-by-Step Guide to Preparing for the CLEP Natural Sciences Exam

Two Science Domains • One Focused Plan

Biology • Chemistry • Physics • Earth and Space
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Reza Nazari

CLEP Natural Sciences for Beginners

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The Ultimate Step-by-Step Guide to Preparing for the CLEP Natural Sciences Exam

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Week	Coverage	Assessment
1	Practice Test 1; evolution through genetics	Biology mixed set
2	Plants, animals, ecology; measurement through reactions	Half-length mixed review
3	Matter, mechanics, electricity, waves, space, and Earth	Physical Science mixed set
4	Data, experiments, equations, final review	Practice Test 2 and repairs

For this schedule, aim for five study days each week. On four days, use the 45-minute learning cycle from "How to Use This Book." On the fifth, answer a mixed timed set and review the error log.

Two-Week Intensive Plan

Plan on 90–150 minutes per day, divided into two or three focused sessions. This schedule assumes that Practice Test 1 reveals existing knowledge that can be repaired. It is too short for a first pass through every lesson.

Day	Assignment
1	Take and score Practice Test 1; identify six highest-priority chapters.
2–4	Repair the three highest-priority Biological Science clusters.
5–6	Review the remaining biology clusters and complete a timed mixed set.
7–9	Repair the three highest-priority Physical Science clusters.
10–11	Review remaining physical-science clusters and complete a timed mixed set.
12	Review graphs, experiments, mathematics, equations, and common traps.
13	Take Practice Test 2 under the full 90-minute limit; review every uncertainty.
14	Use the 24-hour review and checklist; stop heavy study early enough to rest.

An Intensive Plan Is Triage. Two weeks can organize existing knowledge and repair selected gaps. A page-by-page rush will leave most ideas difficult to retrieve. Prioritize high-weight weak areas, work without notes, and protect sleep before the exam.

A Weekly Progress Check

At the end of each week, answer five questions:

1. Which concepts can I now explain without notes?
2. Which errors appeared more than once?
3. How much have interpretation and application improved alongside recall?
4. What are the next three study priorities?
5. Which priorities will I study actively, mix with older material, and retest under time before changing the plan?

Contents

Understanding the CLEP Natural Sciences Exam . . . iii

Part I: Biological Science **1**

1 Nature of Life and Scientific Investigation . . . 1
1.1 Life Is a Pattern of Connected Properties . . . 2
1.2 Cells Maintain Boundaries and Run Metabolism . . . 3
1.3 Information Connects Development, Reproduction, and Evolution . . . 4
1.4 Life Is Organized Across Scale . . . 5
1.5 How Scientific Investigation Builds an Answer . . . 6
Chapter Practice: Concept Builder . . . 8
2 Origin of Life, Evolution, and Natural Selection . . . 9
2.1 Early Earth and the Origin-of-Life Question . . . 11
2.2 Populations Carry Heritable Variation . . . 11
2.3 Natural Selection Changes Populations . . . 12
2.4 Evolution Has More Than One Mechanism . . . 13
2.5 Speciation Produces Branches, Not Ladders . . . 15
2.6 Independent Evidence Reconstructs Life's History . . . 15
Chapter Practice: Concept Builder . . . 17
3 Classification and Diversity of Life . . . 19
3.1 Names Are Tools, Not the Tree Itself . . . 20
3.2 Traits and DNA Reveal Branching History . . . 21
3.3 Read Trees from Nodes, Never from Tip Order . . . 22
3.4 Keys Identify Organisms; Trees Explain Relationships . . . 24
3.5 Biodiversity Is Variation at Several Scales . . . 25
Chapter Practice: Concept Builder . . . 27
4 Chemistry of Life . . . 28
4.1 Water Makes Cellular Chemistry Possible . . . 30
4.2 The Big Idea: Monomers, Polymers, and the Elements of Life . . . 30
4.3 Carbohydrates: Quick Energy and Structure . . . 32
4.4 Lipids: Storage, Membranes, and Signals . . . 33
4.5 Proteins: The Body's Workers . . . 34
4.6 Nucleic Acids: The Information Molecules . . . 36
Chapter Practice: Concept Builder . . . 38
5 Cell Structure and Function . . . 40
5.1 Cell Theory and the Two Basic Kinds of Cells . . . 41
5.2 A Closer Look at the Organelles . . . 43
5.3 Plant Cells and Animal Cells . . . 44
5.4 The Cell Membrane: A Selective Border . . . 46
5.5 Passive Transport: Going with the Gradient . . . 48
5.6 Active Transport and Bulk Transport . . . 49
5.7 Tonicity: Osmosis and the Living Cell . . . 50
6 Cellular Energy: Photosynthesis and Respiration . . . 53
6.1 How Cells Get and Spend Energy . . . 53
6.2 ATP Couples Energy Release to Cellular Work . . . 56
6.3 Respiration Happens in Linked Stages . . . 56
6.4 Use Inputs, Outputs, and Location to Solve Questions . . . 57
7 Cell Division . . . 59
7.1 The Cell Cycle: Grow, Copy, Divide . . . 61
7.2 Mitosis: One Cell Becomes Two Genetically Similar Cells . . . 62
7.3 Meiosis: Two Divisions Produce Varied Haploid Products . . . 63
7.4 Mitosis vs. Meiosis, Side by Side . . . 65
Chapter Practice: Concept Builder . . . 67
8 DNA, RNA, and Gene Expression . . . 69
8.1 The DNA Molecule . . . 70
8.2 Genes, Chromosomes, and DNA Replication . . . 72
8.3 RNA: Several Working Roles . . . 74
8.4 The Central Dogma: Transcription and Translation . . . 75
8.5 Mutations: When the Code Changes . . . 77
8.6 Gene Regulation and Biotechnology: Reading DNA With Care . . . 78
Chapter Practice: Concept Builder . . . 80
9 Genetics and Heredity . . . 83
9.1 The Vocabulary of Inheritance . . . 84
9.2 Mendel's Big Ideas . . . 86
9.3 Punnett Squares: Setting Up a Cross . . . 87
9.4 Reading Probabilities From a Cross . . . 88
9.5 When Traits Are Not So Simple . . . 90
Chapter Practice: Concept Builder . . . 93
10 Plant Structure, Function, and Reproduction . . . 95
10.1 Plant Bodies Are Modular and Still Growing . . . 96
10.2 Xylem and Phloem Connect Distant Organs . . . 97
10.3 Leaves Balance Carbon Gain and Water Loss . . . 99
10.4 Plants Sense and Respond Through Growth and Signaling . . . 100
10.5 Flowers Launch the Next Sporophyte Generation . . . 101
Chapter Practice: Concept Builder . . . 102
11 Animal Biology and Human Body Systems . . . 103
11.1 The Body Works as a Team . . . 105
11.2 Different Animals Solve the Same Problems Differently . . . 107
11.3 The Core Skill: Trace the Chain . . . 109
11.4 Delivering Oxygen and Nutrients . . . 111
11.5 Control and Coordination . . . 112
11.6 Movement and Support . . . 113
11.7 Balance and Defense . . . 113
11.8 Whole-Body Responses . . . 114
Chapter Practice: Concept Builder . . . 117
12 Reproduction and Development . . . 119
12.1 What the Reproductive System Does . . . 120
12.2 The Male Reproductive System . . . 122
12.3 The Female Reproductive System . . . 123
12.4 The Hormones That Run the System . . . 124
12.5 From Fertilization to Implantation . . . 125
Chapter Practice: Concept Builder . . . 129
13 Ecology and Ecosystems . . . 130
13.1 Ecology Works Across Connected Levels . . . 131
13.2 Populations Grow, but Environments Set Limits . . . 133
13.3 Interactions Build Communities . . . 134
13.4 Energy Flows Through Food Webs . . . 135
13.5 Matter Cycles Between Reservoirs . . . 136
13.6 Biodiversity, Resilience, and Human Choices . . . 137
Chapter Practice: Concept Builder . . . 138
14 Population Biology and Environmental Science . . . 140
14.1 Thinking in Environmental Systems . . . 141
14.2 Air Pollution and Atmospheric Chemistry . . . 142
14.3 Water Quality, Treatment, and Eutrophication . . . 145
14.4 Chemical Fate and Food-Web Exposure . . . 147
14.5 Environmental Data and Evidence . . . 149
14.6 Exposure, Equity, and Safer Design . . . 150
14.7 A Unified Environmental-Chemistry Decision Process . . . 152
Chapter Practice: Concept Builder . . . 153

Part II: Physical Science **154**

15 Measurement, Mathematics, and Scientific Problem Solving . . . 155
15.1 The Metric System and Common Science Units . . . 155
15.2 Prefixes and Converting by Powers of Ten . . . 156
15.3 Laboratory Tools: Which One Measures What . . . 158
15.4 Reading Scales, the Meniscus, and Estimating . . . 159
15.5 Accuracy and Precision . . . 160
16 Matter and Atomic Structure . . . 164
16.1 Inside the Atom . . . 164
16.2 Atomic Number, Mass Number, Isotopes, and Ions . . . 165
16.3 Elements, Compounds, and Mixtures . . . 167
16.4 The Periodic Table . . . 168
17 Nuclear Science and Radioactivity . . . 172
17.1 Reading the Nucleus . . . 172
17.2 Why Some Nuclei Are Stable . . . 174
17.3 Nuclear Equations Keep Two Counts . . . 174
17.4 Random Events, Predictable Populations . . . 176
17.5 Radiation Type Changes the Safety Problem . . . 178
17.6 Binding Energy and Mass–Energy . . . 181
17.7 Applications Require Both Benefit and Control . . . 183
17.8 Elementary Particles: A CLEP-Level Map . . . 184
18 Chemical Bonding . . . 187
18.1 Why Atoms Bond . . . 188
18.2 Lewis Symbols: A Map of Valence Electrons . . . 189
18.3 Ionic Bonding: Ion Formation and Lattice Attraction . . . 189
18.4 Covalent Bonding: Shared Electron Pairs . . . 191
18.5 Bond Polarity and Molecular Polarity . . . 191
18.6 Four Structures, Four Property Patterns . . . 193
18.7 Water, Dissolving, and Electrical Conductivity . . . 193
18.8 Reading Chemical Formulas . . . 194
Chapter Practice: Concept Builder . . . 197
19 Chemical Reactions . . . 199
19.1 Reactants, Products, and Signs a Reaction Happened . . . 199
19.2 Conservation of Mass . . . 200
19.3 Reading an Equation: Coefficients and Subscripts . . . 201
19.4 Balancing Equations Step by Step . . . 202
19.5 Recognizing Common Reaction Patterns . . . 203
19.6 Endothermic and Exothermic Reactions . . . 203
19.7 What a Reaction Rate Is . . . 204
19.8 Collision Theory: Why Reactions Happen . . . 205
19.9 Temperature and Concentration . . . 206
19.10 Surface Area and Catalysts . . . 207
20 Solutions, Acids, Bases, and Gases . . . 210
20.1 What Is a Solution? . . . 211
20.2 Solubility: How Much Can Dissolve . . . 212
20.3 Saturation: Not Full, Full, and Overfull . . . 214
20.4 Concentration: Dilute versus Concentrated . . . 215
20.5 What Acids and Bases Are . . . 216
20.6 The pH Scale and Indicators . . . 217
20.7 Neutralization, Strong, and Weak . . . 218
20.8 Conceptual Gas Relationships . . . 220
21 States of Matter and Thermodynamics . . . 222
21.1 Energy and Temperature Change . . . 223
21.2 Phase Changes and Heating Curves . . . 224
21.3 Calorimetry and Thermal Equilibrium . . . 226
21.4 Conduction, Convection, and Radiation . . . 228
21.5 The First and Second Laws . . . 230
21.6 Density, Pressure, and Buoyancy . . . 233
21.7 A Short Special-Relativity Connection . . . 233

22 Motion . . . 236
22.1 Position and Reference Frames . . . 237
22.2 Distance and Displacement . . . 238
22.3 Average Speed and Average Velocity . . . 239
22.4 Motion Diagrams, Tables, and Position–Time Graphs . . . 240
22.5 Acceleration: How Velocity Changes . . . 243
22.6 Relative Velocity in One Dimension . . . 244
23 Forces and Newton's Laws . . . 249
23.1 Systems, Net Force, and Free-Body Diagrams . . . 249
23.2 Newton's Three Laws . . . 252
23.3 Mass, Weight, and the Normal Force . . . 254
23.4 Forces on an Incline . . . 255
23.5 Friction and Drag . . . 256
24 Work, Energy, Momentum, and Machines . . . 261
24.1 Energy: A New Way to Predict Change . . . 261
24.2 Work: Energy Transferred by a Force . . . 262
24.3 Energy Stored in Motion and Interactions . . . 263
24.4 The Work–Energy Theorem: Focus on One Object . . . 266
24.5 System Energy Accounts and Conservation . . . 267
24.6 Power: How Fast Energy Is Transferred . . . 269
24.7 Efficiency: Useful Output Compared with Input . . . 269
24.8 Momentum, Impulse, and Machines . . . 271
25 Electricity and Magnetism . . . 275
25.1 Charge Flow and Energy Transfer . . . 276
25.2 Magnetic Fields and Induction . . . 286
26 Waves, Sound, and Light . . . 290
26.1 A Disturbance on the Move . . . 291
26.2 Sound and Light Applications . . . 298
27 Astronomy: The Solar System . . . 303
27.1 Earth's Motion, Day and Night, and Seasons . . . 303
27.2 Moon Phases, Eclipses, and Tides . . . 305
27.3 The Solar System and Its Objects . . . 307
28 Stars, Galaxies, and the Universe . . . 310
28.1 Stars, Galaxies, and the Universe . . . 310
28.2 What Astronomers Learn from Starlight . . . 312
28.3 Reading the H–R Diagram . . . 313
28.4 Evidence for an Expanding Early Universe . . . 315
29 Earth's Structure and Plate Tectonics . . . 316
29.1 Earth Systems and the Solid Earth . . . 317
29.2 Continental Drift, Plates, and the Evidence . . . 319
29.3 Plate Boundaries: Pull Apart, Meet, or Slide Past . . . 320
29.4 Earthquakes, Faults, and Seismic Waves . . . 322
29.5 Volcanoes, Mountains, and Changing Crust . . . 324
30 Rocks, Minerals, and Geologic Time . . . 325
30.1 Minerals and Their Identification . . . 327
30.2 Igneous, Sedimentary, and Metamorphic Rocks . . . 328
30.3 The Rock Cycle, Weathering, Erosion, and Geologic Time . . . 329
31 Atmosphere, Weather, and Climate . . . 332
31.1 The Atmosphere and Air Pressure . . . 333
31.2 Heating, Humidity, and Clouds . . . 335
31.3 Wind, Fronts, and Storms . . . 337
31.4 Climate, Greenhouse Gases, and Ozone . . . 340
32 Oceans and the Water Cycle . . . 342
32.1 Water Moves Through Earth Systems . . . 343
32.2 Groundwater and Glaciers Shape Land . . . 345
32.3 Ocean Water Changes with Depth . . . 346
32.4 Waves, Tides, Currents, and Ocean Resources . . . 348

Part III: Cross-Disciplinary CLEP Skills 350

33 Graphs, Tables, and Scientific Data . . . 350
33.1 Where Errors Come From: Random and Systematic . . . 351
33.2 Reliability and Validity . . . 352
33.3 Reading a Data Table . . . 353
33.4 Reading Graphs: Points, Axes, and Trends . . . 354
33.5 Interpolation, Extrapolation, and Relationships . . . 356
33.6 Scatter Plots and Lines of Best Fit . . . 357
34 Experimental Design and Evidence . . . 360
34.1 The Three Kinds of Variables . . . 361
34.2 Operational Definitions . . . 363
34.3 Validity and Study Scope . . . 365
34.4 Scientific Inquiry and Explanation . . . 366
34.5 Variation, Prediction, and Supported Conclusions . . . 369
34.6 Correlation Is Not Causation . . . 371
34.7 The CHECK Checklist . . . 373
34.8 Bias and the Strength of Evidence . . . 375

Part IV: Final Review 378

35 Mathematics for Natural Sciences . . . 378
35.1 Ratios, Proportions, and Percent Change . . . 379
35.2 Scientific Notation and Orders of Magnitude . . . 379
35.3 Units and Dimensional Analysis . . . 379
35.4 Rates, Slopes, and Rearranging Equations . . . 380
35.5 Graphs and Data Tables . . . 380
35.6 Six Mixed CLEP Applications . . . 380
36 Equations and Reference Sheet . . . 382
36.1 Measurement and Data . . . 383
36.2 Mechanics and Energy . . . 383
36.3 Waves, Electricity, and Heat . . . 383
36.4 Chemistry and Nuclear Science . . . 384
36.5 Biology Pathways . . . 384
37 100 High-Yield Biological Science Ideas . . . 385
38 100 High-Yield Physical Science Ideas . . . 388
39 Common Traps and Close Distinctions . . . 392
40 The 24-Hour Final Review . . . 394
40.1 Morning: Rebuild the Map . . . 395
40.2 Afternoon: Mixed Retrieval . . . 395
40.3 Evening: Close the Books . . . 395
40.4 During the Test . . . 395

Test Preparation and Full-Length Practice 395

CLEP Natural Sciences Practice Test 1 . . . 397
CLEP Natural Sciences Practice Test 2 . . . 418
10 Online Practice Tests . . . 438
Practice Test Answer Keys . . . 439
Practice Test 1 Explanations . . . 441
Practice Test 2 Explanations . . . 448
Your Personalized Study Plan . . . 455
Chapter Practice Answers and Explanations . . . 458
Performance Tracker . . . 473
Test-Day Checklist . . . 475
A Note from the Author . . . 477

Investigation •
A fair test changes an independent variable, measures a dependent variable, uses an appropriate comparison, and lets evidence shape the conclusion.

Chapter Practice: Concept Builder

1. Which is the best evidence that an unknown structure is alive?
   - **A** It rolls downhill
   - **B** It consists of cells that regulate metabolism using DNA
   - **C** It becomes warm in sunlight
   - **D** It grows by mineral deposition

2. Which is not by itself sufficient to define life?
   - **A** Cellular metabolism
   - **B** Heritable information
   - **C** Integrated homeostasis
   - **D** Movement

3. Cell theory states that new cells arise from
   - **A** nonliving crystals
   - **B** sunlight alone
   - **C** existing cells
   - **D** atoms becoming alive

4. Which component carries out protein synthesis in a typical functioning cell?
   - **A** Nucleus
   - **B** Ribosomes
   - **C** Cell wall
   - **D** Chloroplast

5. Metabolism includes
   - **A** all coordinated chemical reactions
   - **B** only reactions that break molecules down
   - **C** only reactions that capture light energy
   - **D** energy use without chemical transformation

6. Sweating when body temperature rises is an example of
   - **A** speciation
   - **B** mutation
   - **C** homeostasis
   - **D** classification

7. Which statement about homeostasis is correct?
   - **A** Regulated conditions remain at one exact value
   - **B** Regulation maintains dynamic ranges
   - **C** Homeostasis prevents exchange with the environment
   - **D** Homeostasis occurs only in warm-blooded animals

8. Which change is evolutionary?
   - **A** A population's inherited color variants change in frequency
   - **B** A tree grows taller
   - **C** A pupil constricts
   - **D** A muscle strengthens through exercise

9. A tissue is made primarily of coordinated
   - **A** ecosystems
   - **B** populations
   - **C** biospheres
   - **D** cells

10. Which level includes multiple species and abiotic conditions?
    - **A** Ecosystem
    - **B** Population
    - **C** Organism
    - **D** Tissue

Scan Me

11. An emergent property is

[A] a property already present in each isolated part
[B] the simple sum of the parts with no interaction
[C] a shared trait used only to name a group
[D] a system behavior arising from interactions among parts

12. Viruses are usually called acellular because they

[A] contain RNA but never DNA
[B] cannot undergo heritable change
[C] lack cellular organization
[D] carry out metabolism only when nutrients are abundant

13. **Select all that apply**

Which are fundamental features of cellular life, even though a few specialized cells lose some machinery as they mature?

[A] Genetic information
[B] Independent organs
[C] A plasma membrane
[D] Ribosomes

14. **Select all that apply**

Which are individual-level changes?

[A] Development
[B] Acclimation
[C] Allele-frequency change across generations
[D] Growth

15. **Select all that apply**

Which show information flow?

[A] Heat disperses from metabolism
[B] A signal changes cell activity
[C] DNA copied before cell division
[D] A gene used to build RNA

16. **Select all that apply**

Which statements about viruses are correct?

[A] They contain genetic material
[B] They can evolve
[C] They use host cells to reproduce
[D] They have independent cellular metabolism

A **Answers and explanations** are on page 458.

Chapter 2

Origin of Life, Evolution, and Natural Selection

Evolution is the thread that connects every organism: inherited information changes in populations, environments filter variation, and branching descent produces life's diversity.



Sources of evolutionary change

- ☐ **Mutation:** A change in DNA. When it occurs in a cell that contributes to offspring, the new version can enter the next generation.
- ☐ **Genetic drift:** Random change in allele frequencies that is strongest in small populations.
- ☐ **Gene flow:** Movement of alleles between populations through migration and reproduction.
- ☐ **Natural selection:** Differential survival and reproduction caused by heritable differences.

Outcomes across generations

- ☐ **Fitness:** Evolutionary fitness is measured by reproductive success. A long life matters only if it helps an organism leave surviving offspring.
- ☐ **Speciation:** New species form when lineages diverge enough to remain reproductively distinct.
- ☐ **Adaptation:** A heritable feature that improves reproductive success in a particular environment.
- ☐ **Common ancestor:** An ancestral population from which two or more lineages descended.

What You Need to Know

Evolution does not mean that an individual changes because it tries or needs to. It means that heritable characteristics of populations change across generations—often measured as changes in allele or genotype frequencies. Natural selection is one mechanism, but mutation, gene flow, genetic drift, recombination, and in some organisms horizontal gene transfer also shape populations. Evidence from fossils, anatomy, biogeography, development, and DNA lets biologists reconstruct the branching history of life.

Learning Objectives

By the end of this chapter, you should be able to:

- connect heritable variation to differential reproductive success
- distinguish adaptation, acclimation, and ordinary development
- compare selection, mutation, gene flow, and genetic drift, using Hardy–Weinberg expectations as a baseline
- explain how reproductive isolation can produce new species
- read a simple phylogenetic tree without treating it as a ladder
- evaluate several independent lines of evolutionary evidence

Chapter Orientation

Start with: Review DNA variation, inheritance, reproduction, and populations.
Central idea: Evolution changes populations across generations when heritable variants differ in reproductive success or by chance.
Suggested study time: 55–70 minutes plus model practice
Before you begin: Does an individual organism evolve during its lifetime? Explain your first answer.

The One Question to Keep Asking

When you read an evolution example, ask: *Which inherited variants left more copies in the next generation?* Survival matters only when it affects reproduction. A long-lived organism that leaves no offspring contributes less to the next generation than a shorter-lived organism that leaves many fertile offspring.