

CLEP® Natural Sciences

... *At a Glance*

Description of the Examination

The Natural Sciences examination covers a wide range of topics frequently taught in introductory courses surveying both biological and physical sciences at the freshman or sophomore level. Such courses generally satisfy distribution or general education requirements in science that usually are not required of, nor taken by, science majors. The Natural Sciences exam is not intended for those specializing in science; it is intended to test the understanding of scientific concepts that an adult with a liberal arts education should have. It does not stress the retention of factual details; rather, it emphasizes the knowledge and application of the basic principles and concepts of science, the comprehension of scientific information and the understanding of issues of science in contemporary society.

The primary objective of the examination is to give candidates the opportunity to demonstrate a level of knowledge and understanding expected of college students meeting a distribution or general education requirement in the natural sciences. An institution may grant up to six semester hours (or the equivalent) of credit toward fulfillment of such a requirement for satisfactory scores on the examination. Some may grant specific course credit, on the basis of the total score for a two-semester survey course covering both biological and physical sciences.

The examination contains approximately 120 questions to be answered in 90 minutes. Some of these are pretest questions that will not be scored.

Knowledge and Skills Required

The Natural Sciences examination requires candidates to demonstrate one or more of the following abilities in the approximate proportions indicated.

Knowledge of fundamental facts, concepts and principles (about 40 percent of the examination)

Interpretation and comprehension of information (about 20 percent of the examination) presented in the form of graphs, diagrams, tables, equations or verbal passages

Qualitative and quantitative application of scientific principles (about 40 percent of the examination), including applications based on material presented in the form of graphs, diagrams, tables, equations or verbal passages; more emphasis is given to qualitative than quantitative applications.

The subject matter of the Natural Sciences examination is drawn from the following topics. The percentages next to the main topics indicate the approximate percentage of exam questions on that topic.

Biological Science (50%)

10% Origin and evolution of life, classification of organisms

10% Cell organization, cell division, chemical nature of the gene, bioenergetics, biosynthesis

20% Structure, function and development in organisms; patterns of heredity

10% Concepts of population biology with emphasis on ecology

Physical Science (50%)

7% Atomic and nuclear structure and properties, elementary particles, nuclear reactions

10% Chemical elements, compounds and reactions, molecular structure and bonding

12% Heat, thermodynamics and states of matter; classical mechanics; relativity

4% Electricity and magnetism, waves, light and sound

7% The universe: galaxies, stars, the solar system

10% The Earth: atmosphere, hydrosphere, structure features, geologic processes and history

The examination includes some questions that are interdisciplinary and cannot be classified in one of the listed categories. Some of the questions cover topics that overlap with those listed previously, drawing on areas such as history and philosophy of science, scientific methods, science applications and technology, and the relationship of science to contemporary problems of society, such as environmental pollution and depletion of natural resources. Some questions are laboratory oriented.

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Study Resources

Most textbooks used in natural science courses cover the topics in the outline above, but the approaches to certain topics and the emphases given to them may differ.

To prepare for the Natural Sciences exam, it is advisable to study one or more college textbooks (selecting at least one biological science and one physical science textbook), which can be found in most college bookstores. HINT: When selecting a textbook, check the table of contents against the Knowledge and Skills required for this test.

If candidates maintain an interest in scientific issues, read science articles in newspapers and magazines, watch public television programs such as *Nova*, or work in fields that require knowledge of certain areas of science, such as nursing and laboratory work, they will probably be knowledgeable about many of the topics included on the Natural Sciences exam.

Visit www.collegeboard.com/clepprep for additional Natural Sciences resources. You can also find suggestions for exam preparation in Chapter IV of the *CLEP® Official Study Guide*. In addition, many college faculty members post their course materials on their schools' websites.

Sample Test Questions

The following sample questions do not appear on an actual CLEP examination. They are intended to give potential test-takers an indication of the format and difficulty level of the examination and to provide content for practice and review. For more sample questions and info about the test, see the *CLEP Official Study Guide*.

- All of the following are true about air EXCEPT:
 - It is mostly oxygen and carbon dioxide.
 - Air is a mixture of different gases.
 - Air density varies with temperature.
 - Air contains water vapor.
 - Air has a low heat capacity.
- Which of the following is true about prokaryotic cells?
 - They are generally larger than eukaryotic cells.
 - Their DNA is single-stranded rather than double-stranded.
 - They have a cell wall instead of a plasma membrane.
 - Their chromosomes are typically circular rather than linear.
 - They are multinucleated.
- Which of the following is the functional unit of the kidney?
 - Microvillus
 - Neuron
 - Capillary
 - Alveolus
 - Nephron
- Which of the following is true about the temperature of liquid water in a lake that has frozen over during the winter?
 - The coldest water can be found at the lake bottom.
 - The coldest water can be found at middle depths.
 - The warmest water can be found at the lake bottom.
 - The warmest water can be found at middle depths.
 - The warmest water can be found just beneath the ice.
- A population of seed-eating birds exhibits variation in the size of their beaks, with a mean beak size of 12 mm. Beak size is a heritable character that affects the size of seeds a bird may consume (e.g., larger beaks can crack larger seeds). After a drought, plants that produce smaller seeds are rare, but plants that produce larger seeds are still common.

Which of the following evolutionary mechanisms will most influence the beak size of the bird population after a drought?

 - Genetic drift
 - Gene flow
 - Natural selection

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- D. Sexual selection
 - E. Mutation
6. A person drops a rock from a height of 12 meters above Earth's surface. The rock starts at rest and falls to the ground. At what height does the rock achieve half of its maximum kinetic energy?
- A. 12 meters
 - B. 9 meters
 - C. 6 meters
 - D. 3 meters
 - E. 0 meters
7. Which of the following best describes the moon as it appears from Earth when the moon-Earth-sun angle is about 45 degrees?
- A. A full moon
 - B. A crescent moon
 - C. A gibbous moon
 - D. A half moon
 - E. A new moon
8. The atomic masses of carbon and oxygen are 12 and 16, respectively. What is the approximate percent by mass of oxygen in carbon dioxide, CO₂ ?
- A. 25%
 - B. 50%
 - C. 66%
 - D. 75%
 - E. 85%

Credit Recommendations

The American Council on Education has recommended that colleges grant 6 credits for a score of 50, which is equivalent to a course grade of C, on the CLEP Natural Sciences exam. Each college, however, is responsible for setting its own policy. For candidates with satisfactory scores on the CLEP Natural Sciences examination, colleges may grant credit toward fulfillment of a distribution requirement, or for a particular course that matches the exam in content. Check with your school to find out the score it requires for granting credit, the number of credit hours granted and the course that can be bypassed with a passing score.

Answers to Sample Questions: 1-A; 2-D; 3-E; 4-C; 5-C; 6-C; 7-B; 8-D

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