Biology 1A Study Guide
Credit by Exam (CBE)

The exam you are interested in taking is designed to test your proficiency in the relevant subject matter. You should be thoroughly familiar with the subject matter before you attempt to take the exam. This CBE Study Guide can help you prepare for the exam by giving you an idea of what you need to review. You can check your familiarity level by reviewing the Texas Essential Knowledge and Skills (TEKS) for this course (see below). To refine your skills, you can refer to any of the state-adopted textbooks.

Texas Essential Knowledge and Skills (TEKS)
Every question that appears on this exam is derived from the knowledge and skills statements and student expectations within the Texas-mandated standards, the Texas Essential Knowledge and Skills (TEKS). You can view the TEKS for this exam online via the following link: http://ritter.tea.state.tx.us/rules/tac/chapter112/ch112c.html#112.34. Refer to section (c), Knowledge and skills, 1A–12F.

Throughout this guide, you'll see TEKS references. These refer to the numbers listed under (c) Knowledge and skills; for example, 1A or 3B. **Note:** Coverage of the TEKS is split between Biology 1A and 1B; so those TEKS not covered in this exam are covered in the Biology 1B CBE.

CBEs and End of Course Exams
TEA recently instituted a new policy for exams for acceleration under 19 TAC Chapter 74 Curriculum Requirements, Subchapter C, Other Provisions, §74.24. The Algebra 1, Biology, English 1, English 2, and United States History exams for acceleration (credit by exams with no prior instruction) must have been validated to meet the rigor of the end of course exams. However, credit by exams used for credit recovery do not need to meet this rigor. We are still offering credit by exams (with prior instruction) in these subjects for credit recovery only. For more information about this policy change, please visit: http://www.tea.state.tx.us/index3.aspx?id=2206.

Materials Needed
You will need to bring a #2 pencil to complete the exam. You will receive a computer-graded answer sheet when you arrive at the testing center.

Exam Structure
You will be allowed **3 hours** to complete this exam. The exam consists of 50 multiple-choice questions worth 2 points each for a total of 100 points. The exam consists of the following 4 parts:
    Part 1: Science Processes and Methods (15 questions)
    Part 2: Cells (15 questions)
    Part 3: Natural Selection (10 questions)
    Part 4: Taxonomy (10 questions)

Scholastic Honesty

When you arrive at the testing center, you will be asked to carefully read the exam rules and sign a statement agreeing to take the exam in accordance with the rules. This is called the Examinee's Certification. The following is a copy of these rules:

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Examinee's Certification

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This certification must be signed *before* the exam is administered and then returned with the completed examination attached, or credit for the exam will not be given.

Scholastic dishonesty is a serious academic violation that will not be tolerated. Scholastic dishonesty encompasses, but is not limited to:

- copying from another student's work;
- using an unauthorized testing proctor or taking the exam at an unauthorized testing location;
- using materials not authorized by a testing proctor;
- possessing materials that are not authorized by a testing proctor, such as lessons, books, or notes;
- knowingly using or soliciting, in whole or part, the contents of an unadministered test;
- collaborating with or seeking aid from another student without authorization during the test;
- substituting for another person, or permitting another person to substitute for oneself, in taking a course test or completing any course-related assignment;
- using, buying, stealing, or transporting some or all of the contents of an unadministered test, test rubric, homework answer, or computer program.

Evidence of scholastic dishonesty will result in a grade of *F* on the examination and an *F* in the course (if applicable).

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*At the testing center, you will be asked to sign a statement that says
you have read the above and agree to complete the examination with scholastic honesty.*

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General Study Tips

The bulleted lists and sample questions in this study guide can assist you in preparing for the exam. It is a fairly complete guide, but does not cover every item on the test. Ultimately, you should use the TEKS to guide your exam preparation.

Additional Study Tips

The following information provides direction for your studies. For each part, you will find study tips and sample questions to give you a general idea of the type of questions you can expect to see on the exam.

Part 1: Science Processes and Methods

This part relates to your knowledge of science processes and methods. It includes 15 questions worth 2 points each, for a total of 30 points.

Study Tips for Part 1

This part relates to TEKS 1A–3F. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

- Safe lab practices, including common safety symbols and why they are important
- Proper disposal of lab materials
- Definition of science (including its limits)
- How to formulate hypotheses
- Difference between scientific hypotheses and scientific theories
- How to design an experiment using the scientific method
- Characteristics of a valid scientific experiment, including an understanding of the terms *control*, *dependent variable*, and *independent variable*
- How to select appropriate equipment for a scientific experiment
- How to make proper measurements
- Difference between accuracy and precision
- Difference between quantitative and qualitative data
- Drawing conclusions and trends from data
- Thinking critically about and analyzing scientific explanations
- "False balance," as it applies to the use of scientific messages by the media
- How scientific research and contributions can impact society and the environment
- History of biology; particularly with regard to the contributions of Aristotle, Robert Hooke, Leonardo da Vinci, Francis Crick, James Watson, Charles Darwin, and Carl Linnaeus
- Cell theory; particularly, the three major ideas associated with the theory

Sample Questions for Part 1
The following are sample questions. You can find the correct answers listed after the questions, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the BEST response to each of the following questions.

1. Suppose you and two lab partners are each measuring the density of an unknown substance. Using the same equipment and procedures, the three of you obtain these results: 4.03 g/ml, 3.90 g/ml, and 8.24 g/ml. Your instructor informs you that the actual density is 6.20 g/ml. The results of your and your lab partners' findings would **BEST** be described as _____.

    A. precise
    B. accurate
    C. both accurate and precise
    D. neither accurate nor precise

2. Which scientist(s) developed the model for deoxyribonucleic acid (DNA)?

    A. Aristotle (384–322 B.C.E.)
    B. Robert Hooke (1635–1703)
    C. Leonardo da Vinci (1452–1519)
    D. Francis Crick (1916–2004) and James D. Watson (1928–)

3. Which of the following is the **BEST** description of the phrase "false balance" in journalism?

    A. Media messages that are not backed by any evidence
    B. Media messages that do not have the scientific community's support
    C. Media messages that present many different viewpoints on a scientific issue, including those that are not related to science
    D. Media messages that present different scientific viewpoints as having equal weight, even though the evidence strongly favors one viewpoint

[1: D; 2: D; 3: D]

Part 2: Cells
This part relates to your knowledge of cells. It includes 15 questions worth 2 points each, for a total of 30 points.

Study Tips for Part 2
This part relates to TEKS 4A–5D. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:
- Characteristics of living organisms
- Difference between prokaryotic and eukaryotic cells
- Identification of plant, animal, and bacterial cells
- Cell organelles; particularly, being able to identify major organelles and their functions within the cells
- Structures found in animal cells but not in plant cells and vice-versa
- Cellular transport; particularly, processes such as osmosis, diffusion, active transport, selective permeability, and endocytosis
- Viruses; particularly, viral shapes, major components of viruses, lytic viruses, the lysogenic cycle, and the role of viruses in causing diseases
- Diseases caused by viruses versus diseases caused by bacteria
- The cell cycle and stages of cellular division
- Meiosis and how it compares to mitosis
- Specialized cells in plants and animals; e.g., stoma, cuticle, epidermis, and mesophyll in plants
- DNA and RNA; particularly, their roles in cell differentiation
- Carcinogens; particularly, a general understanding of how they disrupt the cell cycle
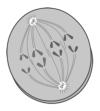
Sample Questions for Part 2
The following are sample questions. You can find the correct answers listed after the questions, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the BEST response to each of the following questions.

1. Which cell organelle is responsible for packaging enzymes?

   A. Nucleus
   B. Cytoplasm
   C. Smooth endoplasmic reticulum
   D. Golgi complex (also called Golgi apparatus)

2. Which cell structure prevents plant cells from using endocytosis as a transport method?

   A. Cytosol
   B. Cell wall
   C. Mitochondria
   D. Plasma membrane

3. The cell shown here is most likely a _____ cell.

   A. plant
   B. fungal
   C. animal
   D. bacterial

[1: D; 2: B; 3: C]

Part 3: Natural Selection

This part relates to your knowledge of natural selection. It includes 10 questions worth 2 points each, for a total of 20 points.

Study Tips for Part 3

This part relates to TEKS 7A–7G. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

- Reliable sources of evidence for determining common descent among organisms; e.g., fossil comparisons, molecular comparisons, and biogeographical studies
- Observing changes in fossil records, including the concepts of stasis, geographical isolation, and selection pressures
- Evolution of plants; particularly, green algae as the ancestral parent of all plants, adaptations leading to the move of plants from water to land, and adaptions that allowed plants to grow taller than six inches
- Natural selection; particularly, the necessary requirements
- Natural selection as it relates to reproductive success
- Role of behavior in natural selection; e.g., behaviors that become genetically determined because they helped organisms survive in the past
- Survival value of a trait; e.g., the role of the environment in which it functions
- Role of competition in natural selection
- Adaptation and change as part of the evolutionary process
- Types of evolution; including coevolution, adaptive radiation, convergent evolution, and continental divergence
- Evolutionary mechanisms; e.g., genetic drift, gene flow, and mutation
- Examples of evolutionary adaptation, such as the peppered moth case study
- Complexity of a cell; particularly with regard to adaptions that allow organisms to adapt and give way to new species

Sample Questions for Part 3

The following are sample questions. You can find the correct answers listed after the questions, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the BEST response to each of the following questions.

1. What adaptation allowed plants to grow taller than approximately 6 inches?

    A. The development of seeds
    B. The presence of chlorophyll
    C. The cuticle layer of plant leaves
    D. The development of vascular tissue

2. Butterflies and bats have adapted to similar lifestyles through clearly different lineages. This type of evolution is called _____.

   A. adaptive radiation
   B. analogous structure
   C. convergent evolution
   D. biological magnification

[1: D; 2: C]

Part 4: Taxonomy

This part relates to your knowledge of taxonomy. It includes 10 questions worth 2 points each, for a total of 20 points.

Study Tips for Part 4

This part relates to TEKS 8A–8C. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

- Taxonomy; particularly, its definition and role in science
- Standardized system of binomial nomenclature; particularly, its advantages to science
- Stages of biological classification; e.g., class, species, domain, kingdom
- Shared characteristics of taxonomic groups; e.g., comparisons between different plants in terms of major anatomical features, and reproductive habits of different plant groups such as flowers and liverworts
- Vascular and non-vascular plants; particularly, the difference between the two groups and examples of each
- Reproductive structures of various organisms; e.g., cones for gymnosperms
- Development of xylem and phloem in ferns
- Examples of primitive organisms; e.g., algae and bacteria as the most primitive
- Relationships between organisms; e.g., be able to analyze features to identify the organisms that are the most closely related and the least closely related
- Common bacterial shapes

Sample Questions for Part 4

The following are sample questions. You can find the correct answers listed after the questions, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the BEST response to each of the following questions.

1. According to the table, which of the vascular plants would have the most complex anatomy?

Characteristics of Vascular Plants

Plant	Roots?	Stems?	Leaves?	Flowers?	Seeds?
Algae	No	No	No	No	No
Pine Tree	Yes	Yes	Yes	No	Yes
Bluebonnet	Yes	Yes	Yes	Yes	Yes
Fern	Yes	Yes	Yes	No	No

A. Fern
B. Algae
C. Pine tree
D. Bluebonnet

2. Which of these stages of biological classification is the most general?

    A. Family
    B. Phylum
    C. Domain
    D. Kingdom

[1: D; 2: C]