



## **Biology 1B 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 1A EA/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 covers a wide variety of topics. To help you study, we have isolated 4 key topics and provided study tips and sample questions for each.

**Topic 1:** Ecology (~15 questions)

**Topic 2:** DNA and the Genetic Code (~20 questions)

**Topic 3:** Biomolecules (~5 questions)

**Topic 4:** Biological Systems (~10 questions)

The topics overlap, so the number of questions listed for each topic are estimates intended to give you a general sense of how many questions relate to each topic. Your best guide is to ensure that you understand the TEKS related to each topic. The number of questions roughly corresponds to the number of TEKS and to the complexity of the TEKS.

## 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:

### Examinee's Certification

**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).**

*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.*

## 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 topic, you will find study tips and sample questions to give you a general idea of the types of questions you can expect to see on the exam.

### Topic 1: Ecology

This topic relates to your knowledge of ecological systems, species interactions, and environmental balance. The exam includes about 15 questions, each worth 2 points, related to this topic.

#### Study Tips for Topic 1

This topic relates to TEKS 11A–12F. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

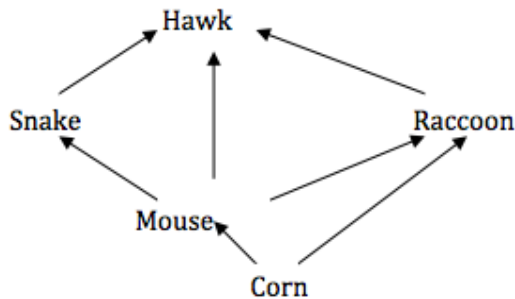
- Role of microorganisms in maintaining and disrupting the health of ecosystems and organisms
- Pathogens; particularly, what happens during the process of phagocytosis
- Role of antibiotics in disease control
- Antibiotic resistance
- Exponential growth of organisms
- Response of organisms, populations, and communities to external factors
- Species diversity; including, the most- and least-diverse places on Earth and the factors that influence levels of diversity
- Energy-flow diagrams, food webs, trophic levels, and energy pyramids
- Percentage of energy available for organisms at each trophic level
- Ecosystem relationships; e.g., interspecific competition, intraspecific competition, dualism, parasitism, mutualism, commensalism
- Ecosystem roles; e.g., predator, prey, decomposer, primary consumer, secondary consumer
- Ecological succession; particularly, the difference between primary and secondary succession
- Pioneer species
- Variations and adaptations of organisms in ecosystems; e.g., differences in physical conditions and organisms in tropical forest biomes versus desert biomes
- Water, carbon, and nitrogen cycles and their effects on Earth's living organisms
- Carrying capacity
- Impact of environmental change on ecosystem stability and humans; e.g., the impact of decreasing number of pollinators on crop production

### Sample Questions for Topic 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. Why does each successive feeding level in an energy pyramid have less biomass?
  - A. The primary consumer level contains more stored energy than the producer levels.
  - B. Consumers have more biomass than producers because they compete better than producers.
  - C. Consumer biomass is less than producer biomass because energy is lost as it flows from producers to consumers.
  - D. There is more competition between producers than between consumers, and the producers are at the lowest level.
  
2. Remora sharks often attach themselves to the sides of whales to catch stray food particles. The whales are neither helped nor harmed by the sharks. This is an example of what type of symbiosis?
  - A. Dualism
  - B. Parasitism
  - C. Mutualism
  - D. Commensalism
  
3. In the following food web, which organism can be classified as both a primary and a secondary consumer?



- A. Corn
- B. Snake
- C. Mouse
- D. Raccoon

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

## Topic 2: DNA and the Genetic Code

This topic relates to your knowledge of organism growth and cell differentiation. The exam includes about 20 questions, each worth 2 points, related to this topic.

### Study Tips for Topic 2

This topic relates to TEKS 5A–6H. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

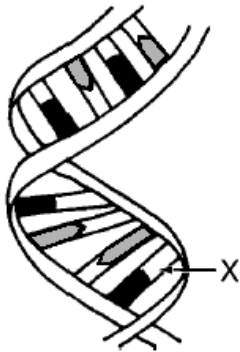
- Stages of the cell cycle
- Specialized cells in plants and animals
- Cellular function; such as the function of the stomata in plants
- Bacterial conjugation
- Roles of DNA and RNA; particularly, similarities and differences
- DNA replication
- Stages of mitotic cell division
- Structure and function of hemoglobin
- Process of protein synthesis; particularly, transcription and translation
- Sequence of events in protein synthesis
- Chromosomes and their role in storing hereditary information
- Structure of nucleic acid molecules, including the names of bases
- mRNA codes within DNA sequences
- Inheritance of traits and the causes of genetic disorders
- Types of DNA mutation; e.g., deletion, insertion, inversion, substitution
- Punnett squares; particularly, how to use one to predict genotypes and phenotypes
- Monohybrid and dihybrid crosses and non-Mendelian inheritance
- Types of traits; e.g., dominant, recessive, codominant, homozygous, heterozygous
- Unregulated cell division and cancer
- Genetic abnormalities; e.g., Down syndrome, hemophilia, Huntington's disease
- Parts of DNA nucleotide and where the replication code is located
- Chromosomal maps; particularly, to diagnose extra autosomal chromosomes
- Meiosis and its role in sexual reproduction
- Techniques used to study the genomes of organisms; e.g., gene maps, karyotypes, amniocentesis, and DNA fingerprinting

### Sample Questions for Topic 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. Ribonucleic acid (RNA) differs from deoxyribonucleic acid (DNA). Which of the following accurately states a characteristic of RNA but not DNA?
  - A. RNA contains a phosphate group.
  - B. RNA forms a double-strand helix.
  - C. RNA contains uracil as a nitrogenous base.
  - D. RNA is located within the nucleus of the cell.
2. Which of the following is the **BEST** explanation for a homozygous trait?
  - A. Two alleles that are different for the trait
  - B. Two alleles that are the same for the trait
  - C. One allele that is the same for the trait; one that is different
  - D. Two alleles where the traits are hidden and not exhibited in the organism
3. The diagram here represents a portion of a nucleic acid molecule. The part that *X* points to could be \_\_\_\_\_.



- A. ribose
- B. cytosine
- C. phosphate
- D. deoxyribose

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

### Topic 3: Biomolecules

This topic relates to your knowledge of metabolic process and energy conversions in living organisms. The exam includes about 5 questions, each worth 2 points, related to this topic.

#### Study Tips for Topic 3

This topic relates to TEKS 9A–9D. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

- Structures and functions of biomolecules; e.g., lipids, proteins, nucleic acids, carbohydrates, starch, amino acids
- Reactants and products of photosynthesis
- Reactants and products of cellular respiration
- Relationship between photosynthesis and respiration
- Role of enzymes, including products and substrates
- Formation of simple organic molecules
- The organization of simple organic molecules into long, complex molecules

#### Sample Questions for Topic 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 are the two byproducts of aerobic cellular respiration?
  - A. Sugar and water
  - B. Sugar and oxygen
  - C. Carbon dioxide and water
  - D. Carbon dioxide and oxygen
  
2. What are the simple building blocks that make up proteins called?
  - A. Nucleotides
  - B. Amino acids
  - C. Monosaccharides
  - D. Glycerol and three fatty acids

[1: C; 2: B]

## Topic 4: Biological Systems

This topic relates to your knowledge of levels of biological systems. The exam includes about 10 questions, each worth 2 points, related to this topic.

### Study Tips for Topic 4

This topic relates to TEKS 10A–10C. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

- Homeostasis and the internal feedback to help maintain it
- Animal systems; e.g., regulation, nutrient absorption, reproduction, defense
- Plant systems; e.g., transport, reproduction, response
- Human respiratory process; particularly, the oxygen sequence
- Function of blood in transporting carbon dioxide and oxygen
- Roles of hemoglobin and red bone marrow in the body
- Types of muscle; e.g., skeletal, smooth, and cardiac
- Transport of nutrients and waste products to and from the fetus
- Parts of the nervous system; e.g., axons, myelin, neurons, dendrites
- Function of peristalsis
- Difference between the peripheral nervous system and the central nervous system
- Levels of organization in the human body
- Migration pathway of an ovum
- Large intestine, small intestine, and intestinal disorders such as diarrhea
- Roles of cartilage, tendons, and ligaments
- Methods of plant pollination; e.g., self-pollination, cross-pollination
- Processes of osmosis, capillary action, and transpiration in plants
- Plant reproduction methods, including by insect, animal, wind, and water
- Major plant structures and how they interrelate; e.g., xylem, cuticle, phloem, root hairs

### Sample Questions for Topic 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.**

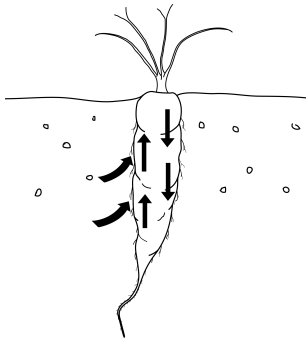
1. Which of the following tissues is responsible for the involuntary contractions that force food through your digestive system?
  - A. Skeletal muscle
  - B. Smooth muscle
  - C. Cardiac muscle
  - D. All muscle types



2. Which of the following shows the correct oxygen sequence in the respiratory process?

- A.  $O_2 \rightarrow$  blood  $\rightarrow$  alveoli  $\rightarrow$  bronchioles  $\rightarrow$  bronchi  $\rightarrow$  lungs
- B.  $O_2 \rightarrow$  lungs  $\rightarrow$  bronchi  $\rightarrow$  bronchioles  $\rightarrow$  alveoli  $\rightarrow$  blood
- C.  $O_2 \rightarrow$  bronchi  $\rightarrow$  bronchioles  $\rightarrow$  alveoli  $\rightarrow$  lungs  $\rightarrow$  blood
- D.  $O_2 \rightarrow$  blood  $\rightarrow$  alveoli  $\rightarrow$  bronchi  $\rightarrow$  bronchioles  $\rightarrow$  lungs

3. What plant structure transports water from the roots to the rest of the plant?



- A. Xylem
- B. Cuticle
- C. Phloem
- D. Root hairs

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