

## **TECEP® Test Description for BIO-101-TE**

### **INTRODUCTION TO BIOLOGY**

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This exam assesses students' knowledge and understanding of concepts from a general biology course for nonmajors. The exam assesses students' knowledge of the structure and function of living organisms and the essential information about characteristics of life, the scientific method, cell structure and function, genetics, microbiology, and comparative biology. (3 credits)

- **Test format:** 100 multiple choice questions (1 point each)
  - **Passing score:** 65% (65/100 points). Your grade will be reported as CR (credit) or NC (no credit).
  - **Time limit:** 2 hours
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### **OUTCOMES ASSESSED ON THE TEST**

- Describe elements of the scientific study of living things
  - Discuss cells, including their elements, organization and membranes.
  - Explain cell processes such as photosynthesis and meiosis, as well as the basics of genetics.
  - Describe how scientists classify and systematize the study of biology.
  - Discuss microbiology, including viruses, bacteria and fungi.
  - Identify the mechanisms of vertebrate evolution.
  - Summarize the principles of comparative biology.
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### **TOPICS ON THE TEST AND THEIR APPROXIMATE DISTRIBUTION**

The table below indicates the main topics covered by this exam and the approximate percentage of the exam devoted to each main topic. Under the main topic heading is a list of related—but more specific—topics. It is important to review these topics to determine how much prior knowledge you have and/or how much additional study is necessary. To assist with refreshing and enhancing your knowledge



of the ideas, concepts, and theories for this subject, links to free and openly licensed review materials are included for each topic.

Concepts of Biology (10%)	
Topic	Resource
Characteristics and organization of living things	<i>Concepts of Biology</i> <ul style="list-style-type: none"><li>• Chapter 1: Introduction to Biology<ul style="list-style-type: none"><li>◦ <a href="#">Section 1.1: Themes and Concepts of Biology</a></li></ul></li></ul>
Components of the scientific method	<i>Concepts of Biology</i> <ul style="list-style-type: none"><li>• Chapter 1: Introduction to Biology<ul style="list-style-type: none"><li>◦ <a href="#">Section 1.2: The Process of Science</a></li></ul></li></ul>
Structure and function of organic compounds <ul style="list-style-type: none"><li>• Carbohydrates, lipids, proteins, nucleic acids</li></ul>	<i>Concepts of Biology</i> <ul style="list-style-type: none"><li>• Chapter 2: Chemistry of Life<ul style="list-style-type: none"><li>◦ <a href="#">Section 2.3: Biological Molecules</a></li></ul></li></ul>
Cells (30%)	
Topic	Resource
Comparison of prokaryote and eukaryote cells	<i>Concepts of Biology</i> <ul style="list-style-type: none"><li>• Chapter 3: Cell Structure and Function<ul style="list-style-type: none"><li>◦ <a href="#">Section 3.2: Comparing Prokaryotic and Eukaryotic Cells</a></li></ul></li></ul>
Comparison of plant and animal cells	<i>Concepts of Biology</i> <ul style="list-style-type: none"><li>• Chapter 3: Cell Structure and Function<ul style="list-style-type: none"><li>◦ <a href="#">Section 3.3: Eukaryotic Cells</a></li></ul></li></ul>
Structure and function of cell organelles	<i>Concepts of Biology</i> <ul style="list-style-type: none"><li>• Chapter 3: Cell Structure and Function<ul style="list-style-type: none"><li>◦ <a href="#">Section 3.3: Eukaryotic Cells</a></li></ul></li></ul>
Properties of the cell membrane	<i>Concepts of Biology</i> <ul style="list-style-type: none"><li>• Chapter 3: Cell Structure and Function<ul style="list-style-type: none"><li>◦ <a href="#">Section 3.4: The Cell Membrane</a></li></ul></li></ul>
Movement of substances across the cell membrane	<i>Concepts of Biology</i> <ul style="list-style-type: none"><li>• Chapter 3: Cell Structure and Function<ul style="list-style-type: none"><li>◦ <a href="#">Section 3.5: Passive Transport</a></li></ul></li></ul>
Cellular Respiration	<i>Concepts of Biology</i> <ul style="list-style-type: none"><li>• Chapter 4: How Cells Obtain Energy</li></ul>



<ul style="list-style-type: none"> <li>Glycolysis, Kreb's Cycle, Electron Transport System, Fermentation</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Section 4.1: Energy and Metabolism</a></li> <li><a href="#">Section 4.2: Glycolysis</a></li> <li><a href="#">Section 4.3: Citric Acid Cycle and Oxidative Phosphorylation</a></li> <li><a href="#">Section 4.4: Fermentation</a></li> </ul>
Photosynthesis	<p><i>Concepts of Biology</i></p> <ul style="list-style-type: none"> <li>Chapter 5: Photosynthesis <ul style="list-style-type: none"> <li><a href="#">Section 5.2: The Light-Dependent Reactions of Photosynthesis</a></li> </ul> </li> </ul>
<b>Cell Division and Genetics (20%)</b>	
Topic	Resource
Structure of chromosomes	<p><i>Concepts of Biology</i></p> <ul style="list-style-type: none"> <li>Chapter 6: Reproduction at the Cellular Level <ul style="list-style-type: none"> <li><a href="#">Section 6.1: The Genome</a></li> </ul> </li> </ul>
Interphase	<p><i>Concepts of Biology</i></p> <ul style="list-style-type: none"> <li>Chapter 6: Reproduction at the Cellular Level <ul style="list-style-type: none"> <li><a href="#">Section 6.2: The Cell Cycle</a></li> </ul> </li> </ul>
Mitosis	<p><i>Concepts of Biology</i></p> <ul style="list-style-type: none"> <li>Chapter 6: Reproduction at the Cellular Level <ul style="list-style-type: none"> <li><a href="#">Section 6.2: The Cell Cycle</a></li> </ul> </li> </ul>
Meiosis	<p><i>Concepts of Biology</i></p> <ul style="list-style-type: none"> <li>Chapter 6: Reproduction at the Cellular Level <ul style="list-style-type: none"> <li><a href="#">Section 6.2: The Cell Cycle</a></li> </ul> </li> </ul>
Cytokinesis in plant and animal cells	<p><i>Concepts of Biology</i></p> <ul style="list-style-type: none"> <li>Chapter 6: Reproduction at the Cellular Level <ul style="list-style-type: none"> <li><a href="#">Section 6.2: The Cell Cycle</a></li> </ul> </li> </ul>
Patterns of Inheritance	<p><i>Concepts of Biology</i></p> <ul style="list-style-type: none"> <li>Chapter 8: <a href="#">Patterns of Inheritance</a></li> </ul>
Mendel's law of genetics	<p><i>Concepts of Biology</i></p> <ul style="list-style-type: none"> <li>Chapter 8: Patterns of Inheritance <ul style="list-style-type: none"> <li><a href="#">Section 8.1: Mendel's Experiments</a></li> </ul> </li> </ul>
Structure of genes	<p><i>Concepts of Biology</i></p> <ul style="list-style-type: none"> <li>Chapter 8: Patterns of Inheritance <ul style="list-style-type: none"> <li><a href="#">Section 8.2: Laws of Inheritance</a></li> </ul> </li> </ul>
Gene expression-protein synthesis	<i>Concepts of Biology</i>



	<ul style="list-style-type: none"> <li>• Chapter 8: Patterns of Inheritance           <ul style="list-style-type: none"> <li>◦ <a href="#">Section 9.3: Transcription</a></li> </ul> </li> </ul>
<b>Evolution, Taxonomy, and Vertebrates (15%)</b>	
Topic	Resource
Concepts of the classification of living things	<i>Concepts of Biology</i> <ul style="list-style-type: none"> <li>• Chapter 12: Diversity of Life           <ul style="list-style-type: none"> <li>◦ <a href="#">Section 12.1: Organizing Life on Earth</a></li> </ul> </li> </ul>
Darwin's Theory of Evolution	<i>Concepts of Biology</i> <ul style="list-style-type: none"> <li>• Chapter 11: Evolution and Its Processes           <ul style="list-style-type: none"> <li>◦ <a href="#">Section 11.1: Discovering How Populations Change</a></li> </ul> </li> </ul>
Mutations	<i>Concepts of Biology</i> <ul style="list-style-type: none"> <li>• Chapter 11: Evolution and Its Processes           <ul style="list-style-type: none"> <li>◦ <a href="#">Section 11.2: Mechanisms of Evolution</a></li> </ul> </li> </ul>
Variations	<i>Concepts of Biology</i> <ul style="list-style-type: none"> <li>• Chapter 11: Evolution and Its Processes           <ul style="list-style-type: none"> <li>◦ <a href="#">Section 11.4: Speciation</a></li> </ul> </li> </ul>
Characteristics and classification of vertebrates: <ul style="list-style-type: none"> <li>• fishes</li> <li>• amphibians</li> <li>• reptiles</li> <li>• birds</li> <li>• mammals</li> </ul>	<i>Concepts of Biology</i> <ul style="list-style-type: none"> <li>• Chapter 15: Diversity of Animals           <ul style="list-style-type: none"> <li>◦ <a href="#">Section 15.6: Vertebrates</a></li> </ul> </li> </ul>
<b>Biodiversity, Viruses, Bacteria, and Fungi (10%)</b>	
Topic	Resource
Challenges to the maintenance of biodiversity including <ul style="list-style-type: none"> <li>• pollution</li> <li>• habitat loss</li> <li>• invasive species</li> </ul>	<i>Concepts of Biology</i> <ul style="list-style-type: none"> <li>• Chapter 21: Conservation and Biodiversity           <ul style="list-style-type: none"> <li>◦ <a href="#">Section 21.2: Threats to Biodiversity</a></li> </ul> </li> </ul>
Characteristics and classification of viruses, bacteria and fungi	<i>Concepts of Biology</i> <ul style="list-style-type: none"> <li>• Chapter 13: Diversity of Microbes, Fungi, and Protists</li> </ul>



	<ul style="list-style-type: none"> <li>○ <a href="#">Section 13.3: Protists</a></li> <li>○ <a href="#">Section 13.1: Prokaryotic Diversity</a></li> <li>○ <a href="#">Section 13.4: Fungi</a></li> </ul>
<b>Comparative Biology (15%)</b>	
Topic	Resource
Structure and function of mammalian systems that perform: <ul style="list-style-type: none"> <li>● gas exchange</li> <li>● digestion</li> <li>● circulation</li> <li>● excretion               <ul style="list-style-type: none"> <li>○ emphasis on human organ systems</li> </ul> </li> </ul>	<p><i>Concepts of Biology</i></p> <ul style="list-style-type: none"> <li>● Chapter 16: <a href="#">The Body's Systems</a> <ul style="list-style-type: none"> <li>○ <a href="#">Section 16.1: Homeostasis and Osmoregulation</a></li> <li>○ <a href="#">Section 16.2: Digestive System</a></li> <li>○ <a href="#">Section 16.3: Circulatory and Respiratory Systems</a></li> </ul> </li> </ul>

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## STUDY MATERIALS

This is a comprehensive list of the materials used in this test description. We encourage you to explore these resources to make sure that you are familiar with multiple perspectives on the topics above. All of these resources are openly licensed, which means that they are free to be [revised, remixed, reused, redistributed, and retained](#), so long as their unique terms are followed. You can learn more about open licensing [here](#).

Most college level Biology Textbooks include the topics listed above and will prepare you for the test. Be sure to compare its table of contents against the topic list to make sure all topics are covered.

Resource Licensing Guide	
Title	License
Global Text Project. (2013, April 25). <a href="#">Concepts of Biology</a> . Houston, TX: OpenStax CNX.	<a href="#">CC BY 4.0</a>
Facciotti, M. (2019, June 02). <a href="#">BIS 2A: Introductory Biology (Britt)</a> .	<a href="#">CC BY-NC-SA 3.0 US</a>

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## SAMPLE QUESTIONS

The questions below are designed to help you study for your TECEP. Answering these questions does not guarantee a passing score on your exam.

Please note that the questions below **will not** appear on your exam.

1. A scientific theory is \_\_\_\_\_.
  - a. a description of the behavior of an aspect of nature under specific circumstances
  - b. an explanation presented in a mathematical formula
  - c. a well-tested explanation for a set of observations
  - d. a tentative explanation for an observation
2. Triglycerides are a combination of these two molecules.
  - a. oils and sugar
  - b. fatty acids and glycerol
  - c. amino acids and sugar
  - d. amino acids and fatty acids
3. Which is a function of the nucleus?
  - a. The nucleus performs cellular respiration
  - b. The nucleus synthesizes protein
  - c. The nucleus is the command center of the cell
  - d. The nucleus maintains turgor pressure
4. During the process of \_\_\_\_\_ molecules move across the plasma membrane from high to low concentration.
  - a. active transport
  - b. endocytosis
  - c. osmosis
  - d. diffusion
5. Which of the following statements about enzymes is true?
  - a. All biochemical reactions require enzymes.
  - b. Enzymes are molecules that lower the activation energy of a reaction.
  - c. Enzymes are molecules that produce nucleotide.
  - d. Enzymes are molecules that help with homeostasis.



6. What process makes bread dough rise?
- glycolysis
  - oxidative phosphorylation
  - cellular metabolism
  - fermentation
7. Where in the eukaryotic cells does photosynthesis occur?
- Golgi body
  - Mitochondrion
  - Chloroplast
  - Nucleus
8. A gardener received a pea plant from her neighbor, and she wants to know its genotype. The neighbor told her it produces round peas, which is a dominant trait (R) to wrinkled peas (r). The gardener performs a test cross and observes that half of the offspring plants produce wrinkled peas. What is the genotype of the plant she received from her neighbor?
- Homozygous recessive, rr
  - Homozygous dominant, Rr
  - Heterozygous recessive
  - Heterozygous, Rr
9. Individual differences with a genetic basis lead to \_\_\_\_\_ in successive generations.
- variation
  - mutation
  - normalization
  - extinction
10. \_\_\_\_\_ is the simplest animal phylum and consists of which animals?
- Platyhelminths, nematodes
  - Platyhelminthes, flatworm sponges
  - Porifera, sponges
  - Arthropoda, centipedes
11. Extinction of a species is most commonly caused by \_\_\_\_\_.
- the introduction of an invasive species
  - habitat loss
  - deforestation
  - over pollution



12. An ovum contains a haploid number of chromosomes. It is referred to as a \_\_\_\_\_.

- a. somatic cell
- b. mutated cell
- c. gamete
- d. daughter cell

13. Which one of the following questions regarding transport is incorrect?

- a. It requires energy.
- b. It uses carrier proteins.
- c. It does not require energy.
- d. It moves substances across the concentration gradient.

14. Which of the following statements best represents the process of cellular respiration?

- a. Glucose and oxygen yield carbon dioxide, water and energy.
- b. Glucose and carbon dioxide yield water and energy.
- c. Glucose and water yield carbon dioxide and energy.
- d. Glucose and oxygen yield carbon dioxide, water and energy.

15. The human heart pumps blood to the lungs for oxygenation. This circuit of blood flow is called \_\_\_\_\_.

- a. systemic circulation
- b. pulmonic circulation
- c. lymphatic circulation
- d. endocrine circulation

16. All of the following are characteristics of viruses EXCEPT \_\_\_\_\_.

- a. they consist of a nucleic acid molecule
- b. they are microscopic
- c. they need a living host to multiply
- d. they can live for years outside a host cell



## ANSWERS TO SAMPLE QUESTIONS

- |        |         |         |
|--------|---------|---------|
| 1. (c) | 7. (c)  | 13. (c) |
| 2. (b) | 8. (b)  | 14. (a) |
| 3. (c) | 9. (a)  | 15. (b) |
| 4. (d) | 10. (c) | 16. (d) |
| 5. (b) | 11. (b) |         |
| 6. (d) | 12. (c) |         |



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