Ohio Tutorials are designed specifically for the Ohio Learning Standards to prepare students for the Ohio State Tests and end-of-course exams.

Biology Tutorials offer targeted instruction, practice, and review designed to help students develop fluency, deepen conceptual understanding, and apply scientific thinking skills. Students engage with the content in an interactive, feedback-rich environment as they progress through standards-aligned modules. By constantly honing their ability to explain and analyze biological scenarios, students build the depth of knowledge and higher-order skills required to demonstrate their mastery when put to the test.

In each module, the Learn It and Try It make complex ideas accessible through focused content, guided analysis, multi-modal representations, and personalized feedback as students reason through increasingly challenging problems. The Review It offers a high-impact summary of key concepts and relates those concepts to students' lives. The Test It assesses students' mastery of the module's concepts, providing granular performance data to students and teachers after each attempt. To help students focus on the content most relevant to them, unit-level pretests and posttests can quickly identify where students are strong and where they're still learning.

## 1. THE NATURE OF LIFE

- **FROM ATOMS TO BIOSPHERE**
  - **B.C.1.a** *Structure, function and interrelatedness of cell organelles*

- **CHARACTERISTICS OF LIFE**
  - **B.C.1.b** *Eukaryotic cells and prokaryotic cells*
  - **B.C.2.a** *Characteristics of life regulated by cellular processes*
  - **B.C.2.b** *Photosynthesis, chemosynthesis, cellular respiration, biosynthesis of macromolecules*
  - **B.E.1.b** *Mutation*

## 2. THE CHEMISTRY OF LIFE

- **BIOMOLECULES**
  - **B.C.2.b** *Photosynthesis, chemosynthesis, cellular respiration, biosynthesis of macromolecules*

- **ENZYMES**
  - **B.C.2.a** *Characteristics of life regulated by cellular processes*

## 3. CELL STRUCTURE

- **PROKARYOTIC AND EUKARYOTIC CELLS**
  - **B.C.1.a** *Structure, function and interrelatedness of cell organelles*
  - **B.C.1.b** *Eukaryotic cells and prokaryotic cells*
  - **B.C.2.a** *Characteristics of life regulated by cellular processes*
  - **B.C.2.b** *Photosynthesis, chemosynthesis, cellular respiration, biosynthesis of macromolecules*

- **PLANT AND ANIMAL CELLS**
  - **B.C.1.a** *Structure, function and interrelatedness of cell organelles*
  - **B.C.1.b** *Eukaryotic cells and prokaryotic cells*

- **B.C.2.a** *Characteristics of life regulated by cellular processes*

## 4. CELL ENERGETICS

- **PHOTOSYNTHESIS**
  - **B.C.2.b** *Photosynthesis, chemosynthesis, cellular respiration, biosynthesis of macromolecules*

- **CELLULAR RESPIRATION**
  - **B.C.2.b** *Photosynthesis, chemosynthesis, cellular respiration, biosynthesis of macromolecules*
  - **B.C.1.a** *Structure, function and interrelatedness of cell organelles*
  - **B.C.1.b** *Eukaryotic cells and prokaryotic cells*
  - **B.C.2.a** *Characteristics of life regulated by cellular processes*

## 5. CELL PROCESSES

- **THE CELL CYCLE**
  - **B.C.2.a** *Characteristics of life regulated by cellular processes*

- **PASSIVE TRANSPORT**
  - **B.C.1.a** *Structure, function and interrelatedness of cell organelles*
  - **B.C.1.b** *Eukaryotic cells and prokaryotic cells*
  - **B.C.2.a** *Characteristics of life regulated by cellular processes*

- **ACTIVE TRANSPORT**
  - **B.C.1.b** *Eukaryotic cells and prokaryotic cells*
  - **B.C.2.a** *Characteristics of life regulated by cellular processes*

## 6. HOMEOSTASIS

- **HOMEOSTASIS AND DYNAMIC EQUILIBRIUM**
  - **B.E.2.a** *Biological classification expanded to molecular evidence*
  - **B.DI.2.a** *Equilibrium and disequilibrium*
  - **B.C.2.a** *Characteristics of life regulated by cellular processes*

- **FEEDBACK MECHANISMS IN ANIMALS**
  - **B.C.2.a** *Characteristics of life regulated by cellular processes*

## 7. DNA STRUCTURE AND FUNCTION

- **COMPONENTS OF DNA**
  - **B.H.2** *Structure and function of DNA in cells*
  - **B.C.2.b** *Photosynthesis, chemosynthesis, cellular respiration, biosynthesis of macromolecules*

- **THE GENETIC CODE**
  - **B.H.2** *Structure and function of DNA in cells*
  - **B.H.3** *Genetic mechanisms and inheritance*

- **BIOTECHNOLOGY**
  - **B.E.1.c** *Genetic drift*

- **B.H.5** *Modern genetics*

## 8. DNA REPLICATION AND PROTEIN SYNTHESIS

- **DNA REPLICATION**
  - **B.H.2** *Structure and function of DNA in cells*

- **TRANSCRIPTION**
  - **B.H.2** *Structure and function of DNA in cells*
  - **B.C.2.b** *Photosynthesis, chemosynthesis, cellular respiration, biosynthesis of macromolecules*
  - **B.H.3** *Genetic mechanisms and inheritance*

- **TRANSLATION**
  - **B.H.3** *Genetic mechanisms and inheritance*

## 9. MEIOSIS AND MUTATIONS

- **MEIOSIS**
  - **B.H.1** *Cellular genetics*
  - **B.E.2.b** *Variation of organisms within species due to population genetics and gene frequency*
  - **B.E.1.a** *Natural selection*

- **GENETIC CHANGES IN DNA**
  - **B.H.4** *Mutations*

- **GENETIC CHANGES IN CHROMOSOMES**
  - **B.H.4** *Mutations*
  - **B.E.2.b** *Variation of organisms within species due to population genetics and gene frequency*

## 10. HEREDITY

- **MENDELIAN LAWS OF HEREDITY**
  - **B.H.5** *Modern genetics*
  - **B.E.2.b** *Variation of organisms within species due to population genetics and gene frequency*
  - **B.H.3** *Genetic mechanisms and inheritance*

- **MULTIPLE ALLELES AND ALLELES WITHOUT DOMINANCE**
  - **B.H.3** *Genetic mechanisms and inheritance*
  - **B.H.5** *Modern genetics*

## 11. EVOLUTION

- **MULTIPLE LINES OF EVIDENCE**
  - **B.DI.3.c** *Extinction*
  - **B.E.2.a** *Biological classification expanded to molecular evidence*
  - **B.DI.1.b** *Species diversity*

- **THE FOSSIL RECORD**
  - **B.DI.3.c** *Extinction*

- **B.E.2.a** *Biological classification expanded to molecular evidence*

## 12. MECHANISMS OF EVOLUTION

- **NATURAL SELECTION**
  - **B.E.1.a** *Natural selection*
  - **B.E.1.c** *Genetic drift*
  - **B.DI.1.b** *Species diversity*

- **EVOLUTION OF SPECIES**
  - **B.E.1.a** *Natural selection*
  - **B.E.1.c** *Genetic drift*
  - **B.E.1.d** *Gene flow (immigration, emigration)*
  - **B.DI.1.a** *Genetic diversity*
  - **B.DI.1.b** *Species diversity*

## 13. CLASSIFICATION

- **TAXONOMY**
  - **B.E.2.b** *Variation of organisms within species due to population genetics and gene frequency*

- **THE SIX KINGDOMS**
  - **B.E.2.b** *Variation of organisms within species due to population genetics and gene frequency*

## 14. MATTER AND ENERGY RELATIONSHIPS

- **FOOD CHAINS AND WEBS**
  - **B.DI.2.a** *Equilibrium and disequilibrium*
  - **B.DI.2.b** *Carrying capacity*
  - **B.DI.3.d** *Invasive species*

- **PYRAMIDS OF ENERGY, NUMBERS, AND BIOMASS**
  - **B.DI.2.a** *Equilibrium and disequilibrium*

## 15. BIOGEOCHEMICAL CYCLES

- **THE CARBON CYCLE**
  - **B.DI.3.a** *Climate change*
  - **B.DI.3.b** *Anthropocene effects*

- **THE NITROGEN AND PHOSPHORUS CYCLES**
  - **B.C.2.a** *Characteristics of life regulated by cellular processes*

## 16. ECOLOGY

- **SUCCESSION IN COMMUNITIES**
  - **B.DI.2.a** *Equilibrium and disequilibrium*

- **NATURAL IMPACTS ON ECOSYSTEMS**
  - **B.DI.2.a** *Equilibrium and disequilibrium*

- **B.DI.3.a** *Climate change*
- **B.DI.3.c** *Extinction*