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.

Unit 1: The Nature of Life

- **FROM ATOMS TO BIOSPHERE**
  - B.C.1.a: Cells Cell structure and function Structure, function and interrelatedness of cell organelles
- **CHARACTERISTICS OF LIFE**
  - B.C.1.b: Cells Cell structure and function Eukaryotic cells and prokaryotic cells
  - B.C.2.a: Cells Cellular processes Characteristics of life regulated by cellular processes
  - B.C.2.b: Cells Cellular processes Photosynthesis, chemosynthesis, cellular respiration, biosynthesis of macromolecules
  - B.E.1.b: Evolution Mechanisms Mutation

Unit 2: The Chemistry of Life

- **BIOMOLECULES**
  - B.C.2.b: Cells Cellular processes Photosynthesis, chemosynthesis, cellular respiration, biosynthesis of macromolecules
- **ENZYMES**
  - B.C.2.a: Cells Cellular processes Characteristics of life regulated by cellular processes

Unit 3: Cell Structure

- **PROKARYOTIC AND EUKARYOTIC CELLS**

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- B.C.1.a: Cells Cell structure and function Structure, function and interrelatedness of cell organelles
- B.C.1.b: Cells Cell structure and function Eukaryotic cells and prokaryotic cells
- B.C.2.a: Cells Cellular processes Characteristics of life regulated by cellular processes
- B.C.2.b: Cells Cellular processes Photosynthesis, chemosynthesis, cellular respiration, biosynthesis of macromolecules

- **PLANT AND ANIMAL CELLS**
  - B.C.1.a: Cells Cell structure and function Structure, function and interrelatedness of cell organelles
  - B.C.1.b: Cells Cell structure and function Eukaryotic cells and prokaryotic cells
  - B.C.2.a: Cells Cellular processes Characteristics of life regulated by cellular processes

Unit 4: Cell Energetics

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

Unit 5: Cell Processes

- **THE CELL CYCLE**
  - B.C.2.a: Cells Cellular processes Characteristics of life regulated by cellular processes
- **PASSIVE TRANSPORT**
  - B.C.1.a: Cells Cell structure and function Structure, function and interrelatedness of cell organelles
  - B.C.1.b: Cells Cell structure and function Eukaryotic cells and prokaryotic cells
  - B.C.2.a: Cells Cellular processes Characteristics of life regulated by cellular processes
- **ACTIVE TRANSPORT**
  - B.C.1.b: Cells Cell structure and function Eukaryotic cells and prokaryotic cells
  - B.C.2.a: Cells Cellular processes Characteristics of life regulated by cellular processes

Unit 6: Homeostasis

- **HOMEOSTASIS AND DYNAMIC EQUILIBRIUM**
  - B.E.2.a: Evolution Speciation Biological classification expanded to molecular evidence

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- B.DI.2.a: Diversity and Interdependence of Life Ecosystems Equilibrium and disequilibrium
- B.C.2.a: Cells Cellular processes Characteristics of life regulated by cellular processes

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

Unit 7: DNA Structure and Function

- **COMPONENTS OF DNA**
  - B.H.2: Heredity Structure and function of DNA in cells
  - B.C.2.b: Cells Cellular processes Photosynthesis, chemosynthesis, cellular respiration, biosynthesis of macromolecules
- **THE GENETIC CODE**
  - B.H.2: Heredity Structure and function of DNA in cells
  - B.H.3: Heredity Genetic mechanisms and inheritance
- **BIOTECHNOLOGY**
  - B.E.1.c: Evolution Mechanisms Genetic drift
  - B.H.5: Heredity Modern genetics

Unit 8: DNA Replication and Protein Synthesis

- **DNA REPLICATION**
  - B.H.2: Heredity Structure and function of DNA in cells
- **TRANSCRIPTION**
  - B.H.2: Heredity Structure and function of DNA in cells
  - B.C.2.b: Cells Cellular processes Photosynthesis, chemosynthesis, cellular respiration, biosynthesis of macromolecules
  - B.H.3: Heredity Genetic mechanisms and inheritance
- **TRANSLATION**
  - B.H.3: Heredity Genetic mechanisms and inheritance

Unit 9: Meiosis and Mutations

- **MEIOSIS**
  - B.H.1: Heredity Cellular genetics
  - B.E.2.b: Evolution Speciation Variation of organisms within species due to population genetics and gene frequency
  - B.E.1.a: Evolution Mechanisms Natural selection
- **GENETIC CHANGES IN DNA**

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- B.H.4: Heredity Mutations

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

Unit 10: Heredity

- **MENDELIAN LAWS OF HEREDITY**
  - B.H.5: Heredity Modern genetics
  - B.E.2.b: Evolution Speciation Variation of organisms within species due to population genetics and gene frequency
  - B.H.3: Heredity Genetic mechanisms and inheritance
- **MULTIPLE ALLELES AND ALLELES WITHOUT DOMINANCE**
  - B.H.3: Heredity Genetic mechanisms and inheritance
  - B.H.5: Heredity Modern genetics

Unit 11: Evolution

- **MULTIPLE LINES OF EVIDENCE**
  - B.DI.3.c: Diversity and Interdependence of Life Loss of Diversity Extinction
  - B.E.2.a: Evolution Speciation Biological classification expanded to molecular evidence
  - B.DI.1.b: Diversity and Interdependence of Life Biodiversity Species diversity
- **THE FOSSIL RECORD**
  - B.DI.3.c: Diversity and Interdependence of Life Loss of Diversity Extinction
  - B.E.2.a: Evolution Speciation Biological classification expanded to molecular evidence

Unit 12: Mechanisms of Evolution

- **NATURAL SELECTION**
  - B.E.1.a: Evolution Mechanisms Natural selection
  - B.E.1.c: Evolution Mechanisms Genetic drift
  - B.DI.1.b: Diversity and Interdependence of Life Biodiversity Species diversity
- **EVOLUTION OF SPECIES**
  - B.E.1.a: Evolution Mechanisms Natural selection
  - B.E.1.c: Evolution Mechanisms Genetic drift
  - B.E.1.d: Evolution Mechanisms Gene flow (immigration, emigration)
  - B.DI.1.a: Diversity and Interdependence of Life Biodiversity Genetic diversity

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- B.DI.1.b: Diversity and Interdependence of Life Biodiversity Species diversity

Unit 13: Classification

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

Unit 14: Matter and Energy Relationships

- **FOOD CHAINS AND WEBS**
  - B.DI.2.a: Diversity and Interdependence of Life Ecosystems Equilibrium and disequilibrium
  - B.DI.2.b: Diversity and Interdependence of Life Ecosystems Carrying capacity
  - B.DI.3.d: Diversity and Interdependence of Life Loss of Diversity Invasive species
- **PYRAMIDS OF ENERGY, NUMBERS, AND BIOMASS**
  - B.DI.2.a: Diversity and Interdependence of Life Ecosystems Equilibrium and disequilibrium

Unit 15: Biogeochemical Cycles

- **THE CARBON CYCLE**
  - B.DI.3.a: Diversity and Interdependence of Life Loss of Diversity Climate change
  - B.DI.3.b: Diversity and Interdependence of Life Loss of Diversity Anthropocene effects
- **THE NITROGEN AND PHOSPHORUS CYCLES**
  - B.C.2.a: Cells Cellular processes Characteristics of life regulated by cellular processes

Unit 16: Ecology

- **SUCCESSION IN COMMUNITIES**
  - B.DI.2.a: Diversity and Interdependence of Life Ecosystems Equilibrium and disequilibrium
- **NATURAL IMPACTS ON ECOSYSTEMS**
  - B.DI.2.a: Diversity and Interdependence of Life Ecosystems Equilibrium and disequilibrium
  - B.DI.3.a: Diversity and Interdependence of Life Loss of Diversity Climate change
  - B.DI.3.c: Diversity and Interdependence of Life Loss of Diversity Extinction

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