

Missouri End-of-Course Assessment Achievement Level Descriptors

Biology

Achievement Levels

Advanced: Students performing at the Advanced level on the Missouri End-of-Course Assessment demonstrate a thorough understanding of the course-level expectations for Biology. They demonstrate these skills in addition to understanding and applying the skills at the Proficient level, students scoring at the Advanced level use a range of strategies.

Scale Score Cut: 225-250

Proficient: Students performing at the Proficient level on the Missouri End-of-Course Assessment demonstrate an understanding of the course-level expectations for Biology. They demonstrate these skills in addition to understanding and applying the skills at the Basic level, students scoring at the Proficient level use a range of strategies.

Scale Score Cut: 200-224

Basic: Students performing at the Basic level on the Missouri End-of-Course Assessment demonstrate a partial understanding of the course-level expectations for Biology. They demonstrate these skills in addition to understanding and applying the skills at the Below Basic level, students scoring at the Basic level use some strategies.

Scale Score Cut: 177-199

Below Basic: Students performing at the Below Basic level on the Missouri End-of-Course Assessment demonstrate a limited understanding of the course-level expectations for Biology. They demonstrate these skills in addition to students scoring at the Below Basic level use very few strategies and demonstrate a limited understanding of important Biological content and concepts.

Scale Score Cut: 100-176

Achievement Descriptors

Advanced

Scale Score Cut: 225-250

Characteristics and Interactions of Living Organisms — A student can

- ✓ Predict the movement of molecules across a selectively permeable membrane needed for a cell to maintain homeostasis
- ✓ Compare and contrast process used in movement of molecules across a semi-permeable membrane, taking energy use into consideration
- ✓ Predict patterns of inheritance, using Mendelian genetics, in a monohybrid cross

Changes in Ecosystems and Interactions of Organisms with Their Environments — A student can

- ✓ Predict how populations within an ecosystem may change in response to changes in abiotic or biotic factors
- ✓ Predict the impact of changes within in a food chain based on energy use and flow
- ✓ Explain how natural selection is related to environmental changes or species adaptations

Scientific Inquiry — A student can

- ✓ Use quantitative data to calculate results
- ✓ Communicate information from investigations in data tables and appropriate graphical forms
- ✓ Identify and justify constants and variables in a repeatable scientific investigation
- ✓ Design a repeatable multi-step scientific investigation
- ✓ Recognize it is not always possible, for practical or ethical reasons, to control some conditions (e.g., when sampling or testing humans, when observing animal behaviors in nature)

Proficient

Scale Score Cut: 200-224

Characteristics and Interactions of Living Organisms — A student can

- ✓ Identify cell differentiation
- ✓ Explain the chemical and physical interactions between organelles as they carry out life processes
- ✓ Explain interrelationships between photosynthesis and respiration (reactant and product only)
- ✓ Determine factors that affect the processes of photosynthesis and respiration (excludes light intensity)
- ✓ Identify homeostasis and its effect on cellular activities
- ✓ Identify the causes of mutations in DNA and explain the possible effects on the organism
- ✓ Describe the chemical and structural properties of DNA
- ✓ Recognize that DNA codes for proteins, which are expressed as the heritable characteristics of an organism
- ✓ Compare the processes of mitosis and meiosis (excludes identification of steps)
- ✓ Explain the advantages and disadvantages of sexual and asexual reproduction within a population
- ✓ Identify diploid and haploid chromosome number
- ✓ Explain how daughter cells compare to the original parent cell
- ✓ Explain how genotypes contribute to phenotypic variation within a species

Changes in Ecosystems and Interactions of Organisms with Their Environments — A student can

- ✓ Identify and explain limiting factors (abiotic and biotic) that may affect carrying capacity
- ✓ Describe how a natural environmental event impacts diversity in an ecosystem
- ✓ Explain the impact human activity may have on the diversity of different species in an ecosystem
- ✓ Predict the energy flow in a food web
- ✓ Explain the natural and/or human factors that may lead to the extinction of a species
- ✓ Given a scenario describing an environmental change, hypothesize why a given species was unable to survive

Scientific Inquiry — A student can

- ✓ Formulate a testable hypothesis
- ✓ Identify constants and variables in an investigation
- ✓ Determine the appropriate tools and techniques to collect, analyze, and interpret data
- ✓ Determine scientific conclusion based on observations
- ✓ Identify factors required to make investigative results reliable
- ✓ Analyze quantitative data
- ✓ Design scientific investigations consisting of at least three steps

- ✓ Explain why accurate records and replications are essential for experimental creditability (includes peer review)
- ✓ Communicate procedures and results of investigations

Basic

Scale Score Cut: 177-199

Characteristics and Interactions of Living Organisms — A student can

- ✓ Identify and describe cell structures and functions
- ✓ Define organelles by their functions
- ✓ Explain how water is important to cells
- ✓ Use a Punnett square to show a simple monohybrid cross

Changes in Ecosystems and Interactions of Organisms with Their Environments — A student can

- ✓ Explain how interactions within an ecosystem maintain balance
- ✓ Explain the nature of interactions between organisms in predator/prey relationships and different symbiotic relationships (i.e., mutualism, commensalisms, parasitism)
- ✓ Define carrying capacity of a population within an ecosystem
- ✓ Identify how adaptations may have provided a population an advantage for survival
- ✓ Identify the impact a natural environmental event may have on the diversity of different species in an ecosystem
- ✓ Explain how environmental factors can be agents of natural selection
- ✓ Explain the importance of reproduction to the survival of a species

Scientific Inquiry — A student can

- ✓ Select appropriate investigation methods (techniques only)
- ✓ Use data to formulate an explanation
- ✓ Calculate average/mean for sets of data
- ✓ Identify possible effects of errors in data collection and calculations

Below Basic

Scale Score Cut: 100-176

Characteristics and Interactions of Living Organisms — A student can

- ✓ Identify that all organisms progress through life cycles
- ✓ Identify that all organisms are made of cells
- ✓ Identify that water is important to cells
- ✓ Identify that all living organisms have DNA
- ✓ Identify that DNA carries inherited information

Changes in Ecosystems and Interactions of Organisms with Their Environments — A student can

- ✓ Describe interactions between organisms in a predator/prey relationship
- ✓ Use a model to show that populations interact in an ecosystem
- ✓ Identify examples of adaptations resulting from natural selection

Scientific Inquiry — A student can

- ✓ Identify a valid conclusion in an experiment
- ✓ Use simple tools to measure length, mass, and volume
- ✓ Communicate basic information from an experiment
- ✓ Construct a simple graph of independent variable versus dependent variable from given data