



East Carter Co. R-II School District  
Course Scope and Sequence

**Course: Biology (grades 10-12)**

# OF DAYS	TOPICS
15	<p>Unit 1: Living Systems</p> <p>Essential Questions:</p> <ul style="list-style-type: none"><li>What are the levels of organization within the earth system?</li><li>How do systems in living things interact to maintain the organism?</li><li>How does the structure of cells relate to different functions and specialization?</li></ul> <p>Concepts: Levels of organization; cell structure; mechanisms of homeostasis</p>
15	<p>Unit 2: Chemistry in Living Systems</p> <p>Essential Questions:</p> <ul style="list-style-type: none"><li>Why is water crucial for life on Earth?</li><li>What properties of water make it important to organisms?</li><li>How is matter changed in chemical reactions?</li><li>How do organisms use chemistry to survive?</li><li>What materials are organisms made of?</li></ul> <p>Concepts: atoms, elements, compounds; polar, nonpolar; enzymes; carbon-based compounds; the cell membrane (passive/active transport)</p>
30	<p>Unit 3: Matter and Energy in Living Systems</p> <p>Essential Questions:</p> <ul style="list-style-type: none"><li>What do plants need to survive? How do plants obtain energy?</li><li>How do animals obtain energy to grow?</li><li>How are energy and matter transferred through organisms and their environments?</li></ul> <p>Concepts: Photosynthesis; Cellular Respiration ; biodiversity; food webs/chains; energy/biomass pyramids; biomagnification; cycling of matter in ecosystems</p>

15	<p>Unit 4: Ecosystems: Stability and Change</p> <p>Essential Questions:</p> <p>How do scientists measure population and changes in population?</p> <p>What causes populations and ecosystems to remain stable or to change over time?</p> <p>What factors affect populations within an ecosystem?</p> <p>How do modest or drastic changes in ecosystems affect ecosystem stability?</p> <p>Concepts: Population dynamics/growth patterns; Interactions in Ecosystems;</p>
10	<p>Unit 5: Cells: Stability and Change</p> <p>Essential Questions:</p> <p>How do organisms balance the growth and division of their cells?</p> <p>How do organisms replace lost or damaged cells?</p> <p>Do all cells grow and divide in the same way? At the same rate?</p> <p>How do organisms with many cell types develop from a single cell?</p> <p>Concepts: Cell theory; cell cycle; mitosis; differentiation;</p>
15	<p>Unit 6: The Structure and Function of DNA</p> <p>Essential Questions:</p> <p>How did scientists determine the structure of DNA?</p> <p>How does the information in DNA get transferred into observable traits?</p> <p>How is the flow of information from DNA regulated?</p> <p>Concepts: DNA structure/function; Protein Synthesis; Gene expression/regulation;</p>
25	<p>Unit 7: Genetics and Heredity</p> <p>Essential Questions:</p> <p>How are traits passed from parents to offspring?</p> <p>Why do the offspring of two parents all look different from each other?</p> <p>How does diversity in traits arise over generations?</p> <p>How can we determine the probability that an organism's expressed version of a trait will be passed on to its offspring?</p> <p>Can scientists alter the genetic material of other organisms? How might humans use this ability?</p> <p>Concepts: Meiosis; Mendel and heredity; traits and probability; mutations and genetic diversity; Genetic engineering</p>

### **Course Description**

In this course, students will be taught the Missouri Learning Standards for Biology as well as gain a basic understanding of topics in biology which they may encounter in their daily lives. The standards will be taught through a variety of activities including lecture, laboratory exercises, cooperative learning with peers, research activities, and projects. Everyday students will be exposed to grade level appropriate concepts related to the Missouri Learning Standards in Biology.