Wildlife Biology

May 2020

Course Description: Wildlife Biology is full year course designed to introduce students to the principles of wildlife management and conservation, and to recognize opportunities for further education and potential careers in the field of wildlife biology. The course includes instruction in the history of wildlife management, ecological concepts, habitat assessment, habitat management, techniques for wildlife, population dynamics, predator-prey relationships, wildlife species biology and identification, human-wildlife conflict resolution, the role of hunting in conservation, game and fish laws and regulations, and the application of scientific principles to managing wildlife habitat and populations.

Big Ideas:

1. Students will be able to identify the physical biology and behavioral acts of wildlife in our area.
2. Students will evaluate human impacts on the wildlife in our area.
3. Students will create solutions to local negative impacts on wildlife in our area.
4. Students will be able to determine how to help the wildlife in our area.
5. Students will be able to identify how the Missouri Department of Conservation improves habitats in our area.

Missouri Science Concepts (Strands 1-6) addressed:

ME.1.I.a Compare the mass of the reactants to the mass of the products in a chemical reaction of physical change (e.g., biochemical processes, carbon dioxide-oxygen cycle, nitrogen cycle, decomposition and synthesis reactions involved in a food web) as support for the Law of Conservation of Mass

ME.2.A Forms of energy have a source, a means of transfer (work and heat), and a receiver

ME.2.F.a Classify the different ways to store energy (i.e., chemical, nuclear, thermal, mechanical, electromagnetic) and describe the transfer of energy as it changes from kinetic to potential, while the total amount of energy remains constant, within a system (e.g., biochemical processes, carbon dioxide-oxygen cycle, nitrogen cycle, food web)

LO.3.A.a Distinguish between asexual (i.e., binary fission, budding, cloning) and sexual reproduction

LO.3.D There is heritable variation within every species of organism

LO.3.D.a Describe the advantages and disadvantages of asexual and sexual reproduction with regard to variation within a population

LO.3.D.c Recognize that new heritable characteristics can only result from new combinations of existing genes or from mutations of genes in an organism's sex cells

EC.1.A All populations living together within a community interact with one another and with their environment in order to survive and maintain a balanced ecosystem

EC.1.A.a Explain the nature of interactions between organisms in predator/prey relationships and different symbiotic relationships (i.e., mutualism, commensalism, parasitism)

EC.1.A.b Explain how cooperative (e.g., symbiotic) and competitive (e.g., predator/prey) relationships help maintain balance within an ecosystem

EC.1.A.c Explain why no two species can occupy the same niche in a community (The functional role of a species is not limited to its placement along a food pyramid; it also includes the interactions of a species with other organisms while obtaining food. For example, the methods used to tolerate the physical factors of its environment, such as climate, water, nutrients, soils, and parasites, are all part of its functional role. In other words, the ecological niche of an organism is its natural history: all the interactions and interrelationships of the species with other organisms and the environment.)

EC.1.B.a Identify and explain the limiting factors (biotic and abiotic) that may affect the carrying capacity of a population within an ecosystem

EC.1.B.b Predict how populations within an ecosystem may change in number and/or structure in response to hypothesized changes in biotic and/or abiotic factors

EC.1.C.a Devise a multi-step plan to restore the stability and/or biodiversity of an ecosystem when given a scenario describing the possible adverse effects of human interactions with that ecosystem (e.g., destruction caused by direct harvesting, pollution, atmospheric changes)

EC.1.C.b Predict and explain how natural or human caused changes (biological, chemical and/or physical) in one ecosystem may affect other ecosystems due to natural mechanisms (e.g., global wind patterns, water cycle, ocean currents)

EC.1.D.a Predict the impact (beneficial or harmful) a natural or human caused environmental event (e.g., forest fire, flood, volcanic eruption, avalanche, acid rain, global warming, pollution, deforestation, introduction of an exotic species) may have on the diversity of different species in an ecosystem

EC.1.D.b Describe possible causes of extinction of a population

EC.2.A As energy flows through the ecosystem, all organisms capture a portion of that energy and transform it to a form they can use

EC.2.A.a Illustrate and describe the flow of energy within a food web

EC.2.A.b Explain why there are generally more producers than consumers in an energy pyramid

EC.2.A.c Predict how the use and flow of energy will be altered due to changes in a food web

EC.2.B.a Explain the processes involved in the recycling of nitrogen, oxygen, and carbon through an ecosystem

EC.2.B.b Explain the importance of the recycling of nitrogen, oxygen, and carbon within an ecosystem

EC.3.C Natural selection is the process of sorting individuals based on their ability to survive and reproduce within their ecosystem

EC.3.C.a Identify examples of adaptations that may have resulted from variations favored by natural selection (e.g., long-necked giraffes, long-eared jack rabbits) and describe how that variation may have provided populations an advantage for survival

EC.3.C.b Explain how genetic homogeneity may cause a population to be more susceptible to extinction (e.g., succumbing to a disease for which there is no natural resistance)

EC.3.C.c Explain how environmental factors (e.g., habitat loss, climate change, pollution, introduction of non-native species) can be agents of natural selection

EC.3.C.d Given a scenario describing an environmental change, hypothesize why a given species was unable to survive

Alignment to Missouri Show-Me Goals and Performance Standards:

1.1 Develop questions and ideas to initiate and refine research

1.2 Conduct research to answer questions and evaluate information and ideas

1.3 Design and conduct field and laboratory investigations to study nature and society **1.5** Comprehend and evaluate written, visual, and oral presentations and works**1.6** Discover and evaluate patterns and relationships in information, ideas and structures**1.8** Organize data, information and ideas into useful forms (including charts, graphs, outlines) for analysis
and presentation

1.10 Apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers**3.2** Develop and apply strategies based on ways others have prevented or solved problems **3.5** Reason inductively from a set of specific facts and deductively from general premises

Alignment to Missouri Show-Me Goals and Content Standards:

SC1 Properties and principles of matter and energy

SC3 Characteristics and interactions of living organisms

SC4 Changes in ecosystems and interactions of organisms with their environments

SC7 Processes of scientific inquiry (such as formulating and testing hypotheses)

SC8 Impact of science, technology and human activity on resources and the environment