



# SCHOOL DISTRICT OF MONROE

*Preparing for the Future, One Child at a Time*

## Natural Science ES

### Course Description:

The curriculum for this elective course is developed from [Wisconsin Standards for Agriculture, Food and Natural Resources](#). This course examines how America's resources provide esthetic, scientific, recreational and economic benefits. Units of study include the principles of fish and wildlife management, i.e., ecology, history of wildlife management, small game, big game, fur bearing animals, fish management, game laws and issues, endangered and threatened species, and aquaculture. This course is science equivalents and count for part of the three high school units of science required for admission to UW institutions. The information in this course overview outlines what students should understand and be able to do by the end of the semester/year.

### Mastery Standards:

Students will explain interrelationships between natural resources and humans necessary to conduct management activities in natural environments. (NR1)

Students will apply scientific principles to natural resource management activities. (NR2)

Students will apply knowledge of natural resources to production and processing industries. (NR3)

Students will demonstrate techniques used to protect natural resources. (NR4)

Unit	Description of Unit and Learning Targets
<p><b>Unit Title: 1. Biomes</b></p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> <li>• What types of biomes are there and where are they located in the world?</li> <li>• What is the main factor that makes a biome different from other biomes?</li> <li>• What is an ecosystem?</li> <li>• How should someone observe the natural world?</li> </ul>	<p>Students will.....</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> <li>• Research a biome and determine the defining characteristics of that biome.</li> <li>• Present biome information using multimedia presentation tools as a team.</li> </ul>
<p><b>Unit Title: 2. Reading the Land</b></p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> <li>• How can erosion be controlled or prevented?</li> <li>• How does soil erosion influence land use and environmental changes in ecosystems?</li> </ul>	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> <li>• Read a topographic map and understand the steepness of slope portrayed in the map.</li> <li>• Design and conduct an experiment to determine the effects of slope and vegetation on erosion.</li> <li>• Use the Web Soil Survey to gather information for land use planning.</li> </ul>
<p><b>Unit Title: 3. The Energy of Life</b></p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> <li>• How can solar energy be used to produce food?</li> <li>• Why are energy pyramids used to show the relationships among organisms in ecosystems?</li> <li>• How does population density relate to</li> </ul>	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> <li>• Determine the sequence of energy flow of a group of organisms and sketch the food web.</li> <li>• Calculate the percent of energy transfer through the trophic levels of a food chain.</li> <li>• Research their ecosystem of choice and determine a food chain present in that ecosystem.</li> </ul>

<ul style="list-style-type: none"> <li>carrying capacity?</li> <li>What are the habitat requirements of animals?</li> </ul>	<ul style="list-style-type: none"> <li>Use a graphic organizer to depict an energy pyramid and the relationships within that pyramid.</li> <li>Simulate the carrying capacity of a deer population in relation to access to food, water, and shelter.</li> <li>Determine the habitat area requirements for a group of animals in an ecosystem and the overall area needed to sustain the ecosystem</li> </ul>
<p><b>Unit Title: 4. Flora of Nature</b></p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> <li>How do biodiversity and ecological succession interact in an ecosystem?</li> </ul>	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> <li>Determine the biodiversity of plants in a given area using a common sampling technique.</li> <li>Conduct a survey of the vegetation present in a given plot of land and classify the plants according to their features.</li> <li>Simulate the process of vegetative succession by role playing in a game.</li> </ul>
<p><b>Unit Title: 5. Flourishing Fauna</b></p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> <li>How do habitat needs influence the population density of animals within a habitat?</li> <li>What are the limitations of using the Punnett Square method when predicting inheritance?</li> <li>What is meant by wildlife management?</li> <li>What are the positive and negative consequences of uncontrolled mating of wildlife populations?</li> </ul>	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> <li>Research the habitat requirements of an animal and write a description of those needs to be used to match an animal with its proper habitat.</li> <li>Organisms use natural processes to adapt to their environments and increase chances of survival.</li> <li>Investigate the adaptive nature of an animal, such as the beak of a bird to its environment in order to acquire food for survival.</li> <li>Human pressures of populations cause artificial selection within a population.</li> <li>Predict the probability of the occurrence of qualitative traits within an animal species using Punnett Squares</li> <li>Various objectives influence the management of wildlife species.</li> <li>Conduct hypothetical wildlife management decisions and identify at least four factors that can affect the size of a wildlife population.</li> <li>Wildlife management includes improving habitat for a focal species.</li> <li>Select a focal species in the ecosystem study and make a habitat management plan for that animal.</li> </ul>
<p><b>Unit Title: 6. Walk in the Park</b></p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> <li>How can humans minimize impacts of human use in natural areas?</li> <li>How does designating land as a National Park or a National Forest help preserve the environment?</li> <li>How does one plan an outdoor extravaganza that incorporates human interests while leaving the smallest footprint possible?</li> </ul>	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> <li>Identify the current uses and the historical states of outdoor recreational areas in their ecosystem and determine how human use has impacted the native species in both beneficial and harmful ways.</li> <li>Research a national park or forest to identify and summarize its history, unique features, and available recreational activities in order to develop a guide.</li> <li>Investigate and plan an outdoor experience that incorporates personal interests while leaving the smallest footprint possible in order to protect the integrity of the natural resource.</li> </ul>
<p><b>Unit Title: 7. Policing Wildlife</b></p>	<p>Students will...</p>

Essential Questions:

- What is the difference in threatened, endangered, and extinct species?
- What steps should humans take to prevent the endangerment or extinction of species?
- How do wildlife, ecosystems, and communities benefit from federal natural resource agencies?

Learning Targets:

- Research species classified as endangered, threatened, sensitive, or extinct and develop an informative flyer.
- Explore the impact of natural resource and conservation practices and policies in relation to sustainability.
- Research federal natural resource agencies and identify primary purposes and responsibilities each agency has regarding water contamination.
- Argue the role of federal natural resource agencies in a water contamination scenario