**Correlation of Lawrence Free State Prairie Learning Outcomes with Kansas College & Career Readiness Standards**

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| **Lawrence Free State Prairie Learning Outcomes:**  **The students will be able to…**   * **Identify common, native species of plants and animals in Douglas Co, KS.** * **Collect quantitative data on the numbers of species and diversity of communities in each of the three treatment plots using random sampling methods.** * **Incorporate sample data in species-area curves to show changes in species diversity between treatments and over time.** * **Use appropriate tools and techniques to gather soil core data in collaboration with KU scientists.** * **Use appropriate tools and techniques to gather insect community data in collaboration with KU scientists.** * **Estimate the energy flow through a prairie ecosystem using models and calculations using biomass sampling data.** * **Compile experimental evidence indicating the effects of human application of nitrogen fertilizer on native plant communities.** * **Monitor changes in community composition in response to plot treatment over time.** * **Develop questions and design and implement data collection techniques to gather evidence of correlation or cause and effect.** * **Generate alternative hypotheses about relationships between organisms and between organisms and their environment and test predictions by gathering and analyzing evidence.** | | **College & Career Readiness (NGSS) Performance Expectations:**  Students who demonstrate understanding can:  **HS-LS2 Ecosystems: Interactions, Energy, and Dynamics**  HS-LS2-1. Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.  HS-LS2-2. Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.  HS-LS2-4. Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.  HS-LS2-5. Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.  HS-LS2-6. Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.  HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.  HS-LS2-8. Evaluate the evidence for the role of group behavior on individual and species’ chances to survive and reproduce.  **HS-LS4 Biological Evolution: Unity and Diversity**  HS-LS4-3. Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.  HS-LS4-4. Construct an explanation based on evidence for how natural selection leads to adaptation of populations.  HS-LS4-5. Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in  the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.  HS-LS4-6. Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.\*  **HS-ESS3 Earth and Human Activity**  HS-ESS3-3. Create a computational simulation to illustrate the relationships among management of natural resources, the  sustainability of human populations, and biodiversity. | |
| **NGSS Science & Engineering Practices**  Asking Questions and Defining Problems  Analyzing and Interpreting Data  Developing and Using Models  Using Mathematics and Computational Thinking  Constructing Explanations and Designing  Solutions  Engaging in Argument from Evidence  Obtaining, Evaluating, and Communicating Information | **NGSS Disciplinary Core Ideas**  LS2.A: Interdependent Relationships in Ecosystems  LS2.B: Cycles of Matter and Energy Transfer in Ecosystems  LS2.C: Ecosystem Dynamics, Functioning, and Resilience  LS2.D: Social Interactions and Group Behavior  LS4.B: Natural Selection  LS4.C: Adaptation  LS4.D: Biodiversity and Humans  PS3.D: Energy in Chemical Processes  ETS1.B: Developing Possible Solutions | | **NGSS Crosscutting Concepts**  Patterns  Cause and Effect  Scale, Proportion, and Quantity  Systems and System Models  Energy and Matter  Stability and Change |
| **Other College and Career Readiness Standards Supported by FSHS Prairie Project:**  **ELA/Literacy –**  **RST.11-12.1** Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or  inconsistencies in the account. (HS-LS2-1),(HS-LS2-2),(HS-LS2-3),(HS-LS2-6),(HS-LS2-8)  **RST.11-12.7** Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to  address a question or solve a problem. (HS-LS2-6),(HS-LS2-7),(HS-LS2-8)  **RST.9-10.8** Assess the extent to which the reasoning and evidence in a text support the author’s claim or a recommendation for solving a scientific or technical problem.  (HS-LS2-6),(HS-LS2-7),(HS-LS2-8)  **RST.11-12.8** Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging  conclusions with other sources of information. (HS-LS2-6),(HS-LS2-7),(HS-LS2-8)  **WHST.9-12.2** Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-LS2-1),(HSLS2-  2),(HS-LS2-3)  **WHST.9-12.5** Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant  for a specific purpose and audience. (HS-LS2-3)  **WHST.9-12.7** Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden  the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS2-7)  **Mathematics –**  **MP.2** Reason abstractly and quantitatively. (HS-LS2-1),(HS-LS2-2),(HS-LS2-4),(HS-LS2-6),(HS-LS2-7)  **MP.4** Model with mathematics. (HS-LS2-1),(HS-LS2-2),(HS-LS2-4)  **HSN-Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and  interpret the scale and the origin in graphs and data displays. (HS-LS2-1),(HS-LS2-2),(HS-LS2-4),(HS-LS2-7)  **HSN-Q.A.2** Define appropriate quantities for the purpose of descriptive modeling. (HS-LS2-1),(HS-LS2-2),(HS-LS2-4),(HS-LS2-7)  **HSN-Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-LS2-1),(HS-LS2-2),(HS-LS2-4),(HS-LS2-7)  **HSS-ID.A.1** Represent data with plots on the real number line. (HS-LS2-6)  **HSS-IC.A.1** Understand statistics as a process for making inferences about population parameters based on a random sample from that population. (HS-LS2-6)  **HSS-IC.B.6** Evaluate reports based on data. (HS-LS2-6) | | | |