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Grasshopper Unit

Goals:

Long-term monitoring of grasshopper species composition and abundance and comparison of native and restored prairies.

Blue Valley Standards (for fifth grade students)

Science as an Inquiry

- **Outcome 1:** The Blue Valley Graduate will individually and as a member of a team, use the processes of science, problem-solving methods and the knowledge of science to become an independent inquirer about the natural world.
 - Benchmark: The fifth grade student understands when to use the scientific inquiry process to ask and answer questions about objects, organisms, and events in the environment

Life Science

- **Outcome 2:** The blue Valley Grade will know and understand the characteristics and structure of organisms: life processes; and interaction of organisms with each other and with their environment.
 - Benchmark: The fifth grade student understands characteristics, structure and needs of organisms.

Kansas State Standards

Standard 1- Science as Inquiry- As a result of activities, all students will develop the abilities to do scientific inquiry, be able to demonstrate how scientific inquiry is applied, and develop understandings about scientific inquiry.

- **Benchmark 1:** The students will demonstrate abilities necessary to do the process of scientific inquiry.
 1. The student will identify questions that can be answered through scientific investigations.
 2. The student will conduct a scientific investigation.
 3. Use appropriate tools, mathematics, technology, and techniques to gather, analyze and interpret data*
 4. Think critically to identify the relationship between evidence and logical conclusions
 6. Communicate scientific procedures and explanations*
- **Benchmark 2:** The students will apply different kinds of investigations to different kinds of questions.
 1. The student will differentiate between a qualitative and quantitative investigation
 2. The student will adapt an existing lab or activity to write a different question, identify another variable, and/or adapt the procedure to guide a new investigation.
- **Benchmark 3:** The students will analyze how science advances through new ideas, scientific investigations, skepticism, and examining evidence of varied explanations.
 1. After doing an investigation, students will generate alternative methods of investigations and/or further questions for study.

3. Students will identify faulty reasoning or conclusions that go beyond evidence and/or are not supported by data.

Standard 3: Life Science- As a result of activities, all students will apply process skills to explore and understand structure and function in living systems, reproduction and heredity, regulation and behavior, populations and ecosystems, and diversity and adaptations of organisms.

- **Benchmark 3:** The students will describe the effects of a changing external environment on the regulation/balance of internal conditions and processes of organisms. *
 1. Understand the effects of change in environmental conditions on behavior of an organism by carrying out a full investigation.*
- **Benchmark 4:** The students will identify and relate interactions of populations of organisms within an ecosystem
 1. Students will recognize that all populations living together and the physical factors with which they interact compose an ecosystem*
 2. Classify organisms in a system by the function they serve (producers, consumers, decomposers.)
 4. Relate the limiting factors of biotic and abiotic resources with a species population, growth, decline, and survival. *
- **Benchmark 5:** The students will observe the diversity of living things and relate their adaptations to their survival or extinction.
 2. The student will understand that adaptations of organisms- changes in structure, function, or behavior contribute to biological diversity

Standard 6: Science in Personal and Environmental Perspectives- As a result of activities, all students will apply process skills to explore and develop an understanding of issues of personal health, population, resources and environment, and natural hazards.

- **Benchmark 2:** The students will understand the impact of human activity on resources and environment.
 1. The students will investigate the effects of human activities on the environment.

National Standards

Standard A – Science as Inquiry- As a result of activities, all students should develop abilities to do scientific inquiry and understandings about scientific inquiry

- Use appropriate tools and technology to gather, analyze and interpret data.
- Develop descriptions, explanations investigation
- Communicate scientific procedures and explanations
- Understandings about scientific inquiry

Standard C- Life Science- As a result of activities, students should develop and understanding of

- Regulation and behavior
 - All organisms must be able to obtain resources to grow, reproduce and maintain stable internal conditions while living in a constantly changing external environment
- Populations and ecosystems

- A population consists of a species that occur together at a given place and time. All populations living together and the physical factors which they interact compose an ecosystems
- Populations can be categorized by the function they serve in an ecosystem.(Producers, consumers, decomposers)
- Sunlight is the major source of energy in ecosystems. The energy is transferred to the food web via producers
- The number of organisms and ecosystem can support depends on the resources and abiotic factors. Lack of resources and other factors limit growth.

Rationale:

Students of Kansas need some basic understanding of the function and natural history of the state’s prairie systems. Students will have an opportunity to participate in a unit of study that will incorporate hands-on learning in an authentic learning activity studying the populations and diversity of grasshoppers between a restored site and a native prairie. The unit of study will offer students the chance to actively perform science research but also to contribute to original research.

Materials and resources needed:

Poster activity of 3 prairies	flags	pinning blocks
Grass activity copy (plant parts)	pins	Styrofoam blocks
Insect nets (need 6)	labels	
Kill jars (need 12)	hand-lens	

Pre-trip Activities:

- Pre-meeting with classroom teachers during this meeting we will put together the most helpful information for them. Below will be my suggestions for pre-trip activities, from that teachers will help design activities that best fit with there time frame.

Day 1

- Teachers introduce the three prairie types of Kansas
- Activity with prairie posters
- www.bellmuseum.org/distancelearning/prairie/build/indexhtml

Day 2

- The 3 limiting factors of each prairie, climate, fire and grazers.
- Introduce students to common grass plants of the prairies, big bluestem, little bluestem, Indian grass, and switch grass.
 - Grass Activity –introduce students to grass parts and functions
 - Students will assume the rolls of the functions of the grass parts to help illustrate structure and function of the different parts. This helps to illustrates how grasses are so dependent on the below ground parts.
 - Then relate to grazers of the prairie effect the prairie
Enter the grazers: Bison, elk and “the grasshopper”

Day 3

- Grasshopper Gravity—Detailed observations of grasshopper
 - In schoolyard catch grasshoppers for observations
 - Attach observation sheet (back at WSC)
 - The set up observation tank with plants collected from where students found grasshoppers. Then add a small # of grasshoppers to observe effect on plants for the week.

Day 4

- Introduce students to a dichotomous key of grasshoppers
- Have students use their grasshoppers that were collected at the schoolyard to use grasshopper key.
- Classroom teacher and students needs to access Konza Prairie website to become familiar with SLTER data collected by their peers in the field.
- Prepare hypothesis for next day activity. What will be the effect on the numbers and species of grasshoppers in the WSC's restored prairie vs. the native prairies of the Konza Prairie.

Day 5

- Come to WSC for Grasshopper activity and enter data on internet. Compile data (attach sheet) and then complete the conclusion and final discussion.

Post trip:

Day 6

- Reflect on Grasshopper activity & final results
- Rest depends on where teachers now want to go with the activity.