

Erika Downing
Fall Plant Inventory
Kepley Middle School
6th & 7th grade science
2006

Rationale:

Fall Plant Inventory was chosen to demonstrate to the students the diversity of plant life and how to identify plants.

Goals:

1. Students will be introduced to the elements that must be present for land to be considered a prairie.
2. Students will be able to identify at least four plants and four animals using guide books and keys.
3. Students will take careful observations on the prairie site.
4. Students will carefully collect plants from the prairie site.
5. Students will learn to use random selection in their investigations.
6. Students will conduct a stem count and measure plant height.
7. Students will correctly record data in tables, and then input that data into Excel.

Unit Outline:

Day one: Students are introduced to the Konza Ed project. Students learn what is required for land to be a prairie.

Day two: Students learn why scientific data should be graphed. Students perform the fruit cocktail lab. Students are introduced how to input data in Excel.

Day three: Students input data from the fruit cocktail lab into Excel. Students learn how to and make a pie chart using Excel. Students compile the entire class' data into Excel. Students compare the class' data to the requirements of the U.S. Department of Agriculture for fruit cocktail.

Day four: Students brainstorm what may be found on the prairie site. Students learn what plants they can expect to see in the fall on the prairie site. Students and teacher review the expectations for the field trip the following day.

Day five: The field trip day. The students will travel to the prairie site and perform the fall plant inventory activity. Students will count each stem in their random sample and measure them as well. Students will be careful to record their data accurately.

Day six: Students will enter their data from the plant inventory into the classroom and Konza Ed databases. While students are waiting to enter the data they are to run through the short grass prairie simulation "Build-a-Prairie", on the website: www.bellmuseum.org/distancelearning/prairie/. After all the data is entered into the databases students will individually create graphs on the data.

Day seven: Students learn what to do with the data now that it has been collected. The students will analyze the data and compare it to that data taken from each of the prairie types at Konza Prairie. Students will discuss any conclusions that can be drawn as to the causes of diversity or lack to diversity.

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.

- Identify questions that can be answered through scientific investigations.
- Design and conduct a scientific investigation.
- Use appropriate tools and technology to gather, analyze and interpret data.*
- Develop descriptions, explanations, predictions, and models using evidence
- Communicate scientific procedures and explanations*
- Understandings about scientific inquiry

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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 ecosystem.*
 - Populations can be categorized by the function they serve in an ecosystem.
 - Sunlight is the major source of energy in ecosystems. The energy is transferred to the food web via producers.
 - The number of organisms an ecosystem can support depends on the resources and abiotic factors. Lack of resources and other factors limit growth.*

Standard G- History and Nature of Science- As a result of activities should develop understanding of:

- Science as a Human Endeavor
 - Women and men of various social and ethnic backgrounds engage in the activities of science, engineering and related fields
 - Science requires different abilities, depending on such factors as the field of study and type of inquiry
- Nature of Science
 - Scientists formulate and test their explanations of nature using observations, experiments, and models. All ideas are tentative, though most major ideas are supported by experimental and observational confirmations
 - It is part of scientific inquiry to evaluate the results of scientific investigations, experiments, observations, models and explanations proposed by other scientists.*

This activity will help meet the following 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.

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- Benchmark 3: The students will understand that natural hazards are dynamic examples of earth processes which cause us to evaluate risks
 - 3. Communicate human activities that can cause/contribute to natural hazards.

Standard 7: History and Nature of Science- As a result of activities, all students will examine and develop an understanding of science as a historical human endeavor.

- Benchmark 1: The students will develop scientific habits of mind.
 - 4. Students will base decisions on evidence
- Benchmark 2: The students will research contributions to science throughout history
 - 1. Recognize that new knowledge leads to new questions and new discoveries.

* Items marked with an asterisk, are particularly applicable to this activity.

Pre-trip Activities:

1. Introduction to prairie habitats and Konza Prairie. One class period in length. At a minimum one computer, projector, and screen is needed so the teacher can go through the website with the kids explaining Konza Ed and prairie types. Preferably each child would have a laptop so the activity could be more hands-on for the students.

2. Students will learn why the data from an experiment should be put into a database and graphed. Students perform the fruit cocktail lab and compare their data to that of the U.S. Department of Agriculture. Materials needed are fruit cocktail cans (one per team), containers to separate each type of fruit, can openers, one computer, lab sheets, graph paper, and data from the U.S. Department of Agriculture.

3. Students will learn what plants and animals and should be found in the fall on a sand prairie site. Students review expectations for the field trip. Materials needed are: signed copies of the field trip letter, pictures of native plants and animals, pressed plant examples of native plants, and guide books.

Field Trip Logistics:

1. **July:** Return to native prairie site, mark plot area for students to research, make a map of the site. Set three possible field trip dates with Juan P., my principal. If any of those days can be pinned down, contact land owner, volunteers, and Konza Ed staff to check for scheduling conflicts with them.

2. **August:** Collect plant samples to be dried of plants at the site to show students. Compile a list of animals with descriptions and photos for the students to use to identify the typical ones found on the site. Have all letters regarding native prairie project translated into Spanish by our ESL teacher. Have the power point that I made at Konza Prairie running on a loop in my classroom the night of open house (date to be determined). Have Dave O. schedule some type of transportation for the field trip based on class sizes. (I will not know my schedule and numbers of students until around August 10th). Late August send home permission forms and letter from Konza Ed. Confirm date with principal, land owner and volunteers.

3. **September:** Make sure I have all permission slips returned. Make alternative supervision arrangements for those unable to attend the field trip. Collect an accurate school lunch count. Confirm transportation reservations with Terri V. Confirm the date with the principal, coaches, other teachers, land owner, and volunteers. The day of the field trip pack additional water, extra lunches, and first aid kit.

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Field Trip Activities:

Field trip equipment needed: data sheets, quadrats, flags, guide books, clip boards, pencils, measuring tape, map of the site, water, lunches, first aid kit, and emergency contact information.

Activities at the site: Students will take a random sample on the site using a quadrat and flags. Students will then classify the plants inside the quadrat, count the stems, and measure them. Students will take two samples per team. While they are taking the data they will record it on a data sheet. I plan to spend at least a half-day at the site, if not a whole day, it will depend on my class schedule and class sizes.

Post-trip Activities:

The following class day after the field trip students will record their data into a classroom database as well as the Konza Ed database. Then students will graph the results from the entire class' findings on graph paper. Materials needed are: computers, graph paper, and the previous day's results. The day after they enter their data into the databases, the students will compare their findings to that of the researchers on Konza Prairie for short, mixed, and tall grass prairies. Students will form hypothesis as to why there is more or less diversity on the sand prairie site. Students will try to decide what the causes of the diversity discrepancies may be. Students will then formulate possible experiments that would prove their hypothesis.

Future Expansion:

If the first field trip goes well I would like to perform the biomass activity and phenology. I am also considering assigning each student an organism to study, write a short paper on, document, and record the phenology associated with that organism. In future years we could take samples from other parts of the prairie site, which are grazed, or get more moisture, and are less sandy which all affect their make-up. Then we could compare those findings to the findings from the sand prairie site.