

Course:

Biodiversity of Grasslands:
FOOD WEBS/CHAINS

**Step by Step
Instructions**

During instruction, adhere to a gradual release of responsibility. First, explain and model the strategy for students (ME) and then have the class complete the strategy together (WE). Next, put students into pairs to practice the strategy. (TWO), and finally, have the students work independently to complete the strategy (YOU).

Learning Objective:

1. Students will be able to recognize plants and animals native to Nebraska prairies.
2. Students will be able to explain the importance of plants to the prairie ecosystem.
3. Students will be able to establish an official herbarium at their local school.
4. Students will be able to construct, examine, and evaluate a food chain and food web interaction.

Engage (me):

Students begin by exploring 4 videos in the “Watch Prairie Animals” activity page on the Platte Basin Timelapse Project website:

<http://plattebasintimelapse.com/ed/chapter/wildlife/>

Next, instruct students to view 4 different videos that they find interesting, but NOT to write anything down. The point of this exercise is to simply engage students in locally found animals in the Nebraska prairie system. Once students have explored the activity for about 5-10 minutes, have them journal about what they watched. Ask the following questions:

1. Which animals did you view on the site?
2. What information—size, predator/prey relationships, where they live, etc.—can you tell me about the animals that you saw?
3. What time of day or night do you think you can find these animals in Nebraska?

These questions will help teach students how to pay attention to details, which will come in handy later when viewing more organisms and recording information about those organisms.

Grade Level:

Middle School

Subjects:

Science, Math, Ecology,
Environmental Studies

Time:

TWO 45-minute class periods or up to FOUR 45-minute class periods with the addition of the outdoor tour activity.

Materials:

Online access to Platte Basin Timelapse website, pencil, paper, resource books of animals and plants of the Nebraska prairies

Standards/Indicators:

see page 5

Explore (we/two):

Students now examine the plants of the prairie by going to the “Prairie Plants” page:

<http://plattebasintimelapse.com/ed/chapter/vegetation/>

Have students read the text—a more traditional way of gathering information—and view the two videos on the page. While watching the first video, have students answer the following questions:

1. Why are plants important?
2. What determines where plants grow?
3. How is the relationship between plants and insects important to the productivity of the prairie?
4. How many plant species are found in Nebraska? In the Platte Basin?
5. What is the value of an herbarium?

Once the first video is complete, have students watch the second video and record the steps needed to start your very own herbarium. There are 5 steps indicated in the video listed below. Review with students after all have viewed the video to make sure they know what is needed to begin collecting and preserving their own plants.

1. Collect Sample
2. Press Sample
3. Identification Confirmed
4. Mounting
5. Labeling

Students should brainstorm after the list is created about what equipment they have in the classroom that could be used to create a plant press. Students should come up with heavy books instead of belts to press plants, left over cardboard boxes, acid free photo mounting paper, large construction paper, glue, old newspapers, magnifying glass.

A separate activity can be done at this point to collect plants found around your school or local park (with permission of course) to begin your own classroom herbarium. Students can create an annual record of plants around their school by having their own herbarium in the classroom.

An **herbarium instruction sheet** (Handout 1: pdf) and separate **plant specimen label** (Handout 2: pdf) is available for you to use in the classroom. The instruction sheet is a handout to students while the plant label is for all students to use.

Explain (two/you)

Students will now explore and explain the connection between plants and animals in the prairie ecosystem in Nebraska. Students must visit the Food Chain/Food Web activity page:

<http://plattebasintimelapse.com/ed/chapter/activities-food-chain-food-web/>

and go through the process of identifying food chains and food webs. As students work through the food chain AND food web activity, have them answer the “**Platte Basin Timelapse Food Chain/Food Web Questions**” (Handout 3: pdf).

In order to answer the questions on the Food Chain/Web handout, students must have the background knowledge (or have access to it) of the following terms: **food web, food chain, species, energy transfer, law of conservation of energy, law of conservation of mass, systems, predator, prey, herbivore, carnivore, scavenger, detritivore, decomposer, trophic level**

Discuss the questions and answers in class to make sure the concepts are well understood, as there can be many misconceptions about food chains and food webs due to misunderstandings about the nature of energy and mass in a system.

Elaborate (you)

At this point, students should be able to construct their own food chains and food webs. See Handout 4 labeled “**Platte Basin Timelapse Food Chain/Food Web Energy Flow Activity**” (Handout 4: pdf).

After creation of the food web, move on to the final question in the Evaluation portion.

Evaluate (you)

Option 1:

Have students complete the “**Prairie Reflection Essay**” (Handout 5: pdf) in order to help demonstrate their learning from the project. The time provided for the essay can be altered to fit within a given time you need, however the questions themselves are directed at synthesizing and evaluating what they have learned and should only be altered to fit the needs of individual students when appropriate.

Option 2 Advanced:

Have students create an outdoor tour of their surrounding school grounds or local park. The area has to be within walking distance of the school and you must have permission to place signs at the site. See Handout 6 **Platte Basin Timelapse Outdoor Tour**. This project is a performance-based assessment. This assessment goes into much greater detail than the exploration of the Prairie section of the Timelapse project, however it does promote the conservation and preservation efforts of the Timelapse project.

Vocabulary

food web, food chain, species, energy transfer, law of conservation of energy, law of conservation of mass, systems, predator, prey, herbivore, carnivore, scavenger, detritivore, decomposer, trophic level, herbarium, tallgrass prairie

Rubric - Platte River Prairies

	A	B	C	D	E
Picture (5)	Color picture included	Does not apply	Does not apply	Does not apply	Missing
Common Scientific Name (5)	Common & scientific names included, written correctly, and scientific name explained	Common & scientific names included, written correctly	Common & scientific names included, not written correctly	Common OR scientific names included	Missing
Identifying Characteristics (5)	6 or more identifying characteristics	5 identifying characteristics	4 identifying characteristics	2 - 3 identifying characteristics	Missing
Distribution: Habitat, Biome, etc (10)	Written description of habitat and small map showing distribution of organism	Not applicable	Written description of habitat but NO map	Not applicable	Missing
Limiting Factors to Population (10)	All biotic and abiotic factors that affect its population size	Not applicable	Biotic OR abiotic factors that affect population included	Not applicable	Missing
Ecological Role (20)	All ecological roles explained: predator/prey interactions; reproductive cycle; temperature tolerance; circadian rhythms; migration or year round; impact on humans (food, pest, aesthetic, etc)	Not applicable	Most ecological roles explained: predator/prey interactions; reproductive cycle; temperature tolerance; circadian rhythms; migration or year round; impact on humans (food, pest, aesthetic, etc) *Missing 2 of the required list above	Not applicable	Missing
Facts (5)	4 unique facts about the organism	3 unique facts about the organism	2 unique facts about the organism	1 unique fact about the organism	Missing
Environmental Awareness (10)	Explain the population size (non-concern, threatened, endangered, etc.); Provide environmental awareness & respect to your organism	Not applicable	Explain the population size (non-concern, threatened, endangered, etc.) OR Provide environmental awareness & respect to your organism	Not applicable	Missing

Standards/Indicators:

Next Generation Science Standards:

Performance Expectations:

- MS-LS2-1 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
- MS-LS2-2 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
- MS-LS2-3 Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

Disciplinary Core Ideas:

- LS2.A Interdependent Relationships in Ecosystems
- LS2.B Cycles of Matter and Energy Transfer in Ecosystems

NE State Standards:

SC8.1.1.e, SC8.1.1.f, SC8.1.1.g, SC8.1.1.h, SC8.1.1.j SC8.1.2 (all) SC8.1.3.h & i SC8.3.3 (all)