

## Graphing Species Diversity: Hula Hoop Results

During the field trip students are put into small groups and work together to identify as many plant and animal species as they can find in a hula hoop laid on the ground. Have students get back into these groups and verify the number of plant and animal species they discovered. Students will graph this information using paper or a computer. Their graphs should include a title, x axis label, y axis label and scale, and a legend (figure 1). After students have finished making individual graphs, they can make a class graph on the board, using butcher paper, or on a computer (figure 2).

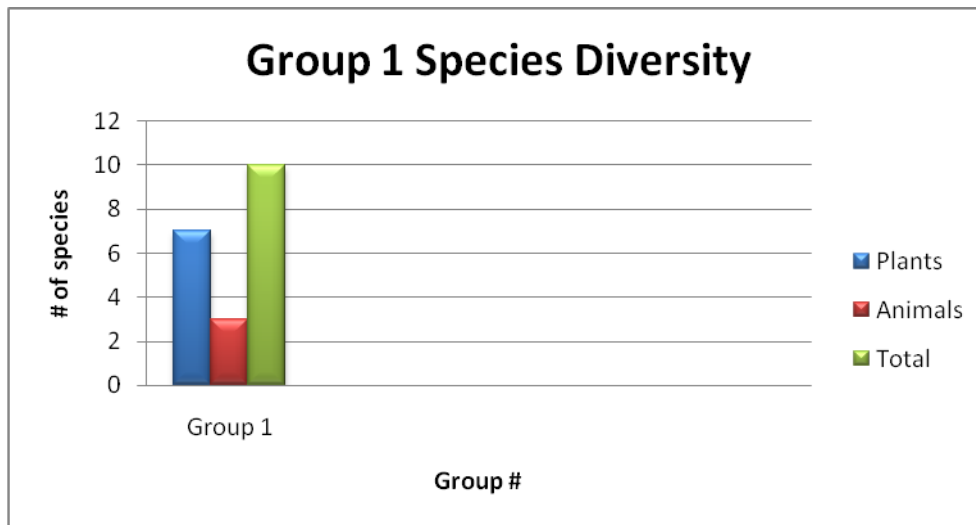


Figure 1: Group one's number of plant and animal species found, and the total amount.

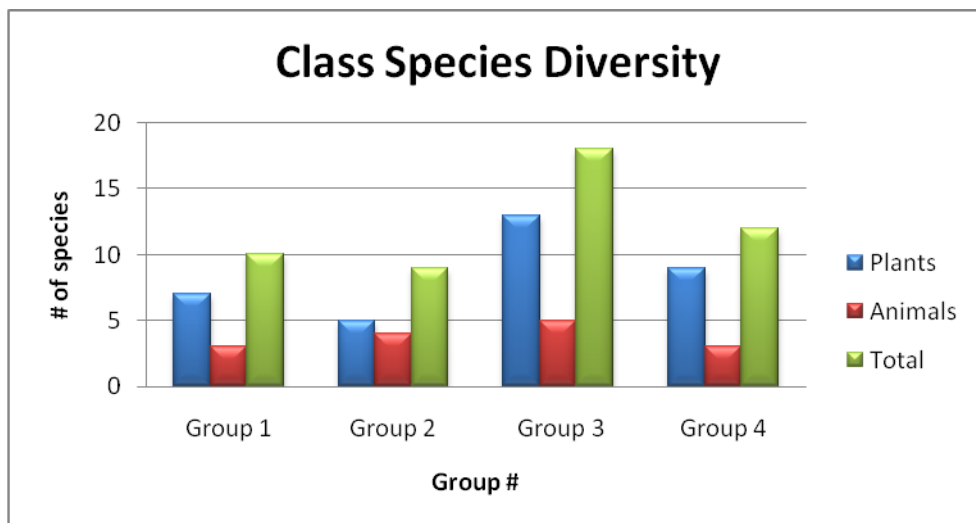


Figure 2: A graph that shows the number of plant and animal species found for the whole class.

# Expository and Narrative Writing Prompts

## I. Write an expository essay in response to one of these specific writing prompts.

1. Describe the Blackland Prairie ecosystem and some of the techniques used to restore it.
2. Compare perennial and annual prairie plants. Include information on their root structure, ability to survive a drought, ability to hold soil, and ability to grow back after a fire.
3. The pavilion at Sneed is a sustainable building. Describe what makes it less harmful to the environment than other buildings. Include information about how it collects energy and water.
4. The prairie has changed dramatically in the past two-hundred years. Describe the plants, animals, and people that were there two-hundred years ago and how things are different today.
5. Bison were a significant animal species on the prairie. Why were they so beneficial to the prairie ecosystem?

## II. Write a narrative about your personal experience at the prairie.

1. What did you most enjoy about the field trip to Sneed prairie? Was there anything you disliked? What did you learn?
2. Why is environmental conservation important to you? Include activities and discussions from the Sneed Prairie field trip, along with your own personal experiences about the environment.

## Water Filtration Experiment

Students conduct an experiment using the scientific method to see if water can be cleaned using a student-made filter. This experiment relates to the rainwater collection system that students observed in the pavilion and discussions about water quality and erosion during the field trip.

### Materials:

- 2 liter soda bottles with top cut off (1 per group)
- Cotton balls
- Sand
- Gravel or stones
- Water
- Vegetable oil
- Dirt

### Hypothesis:

Students write their own hypotheses about what they think will happen to the water that goes through the filter. Example: If dirty water is poured into the water filter, then the water will become clear (or stay dirty).

### Procedure:

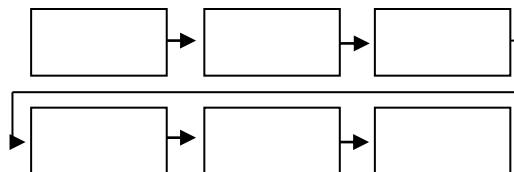
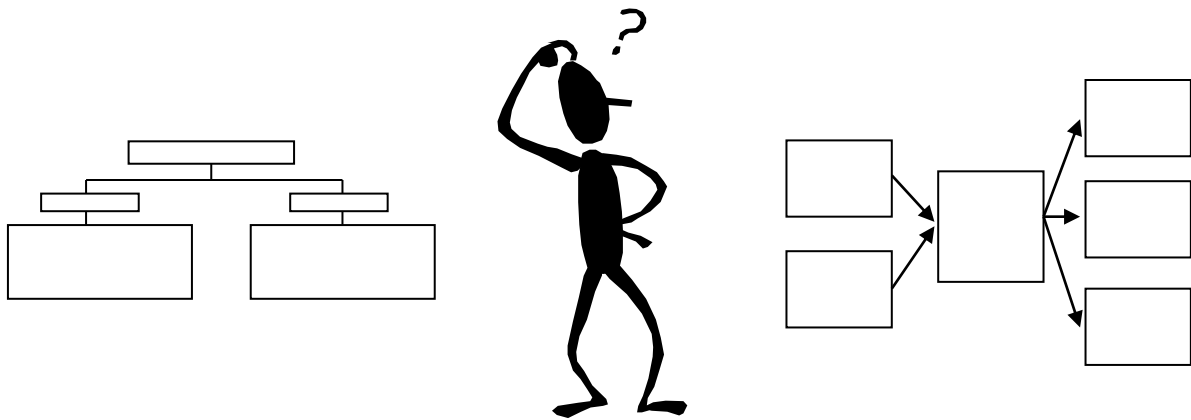
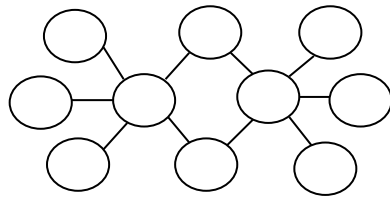
1. Place the top half of the soda bottle upside-down into the inside of the bottom half (like a funnel). The top half is where you will create your filter, and the bottom half is where the filtered water will be held.
2. Layer the filter materials into the top half of the bottle: cotton balls, gravel/stones, and sand.
3. Slowly pour the dirty water into the filter. (To create dirty water use any combination of vegetable oil and dirt). It will take about 5 minutes for the water to start trickling through the filter.
4. Students observe and record the results.

### Results

Have students describe and compare the water that went into the bottle and the water that came through the filter, and note whether their hypothesis was correct or not, and why they think this was the case. Was there variation in the class results? Have students draw a picture of their filter and label the different parts. How does this relate to what they learned about water quality at the prairie? Have the students think about the rain water collection system in the pavilion and the talk about erosion and where we get our drinking water.

## Reading Passages and Thinking Maps

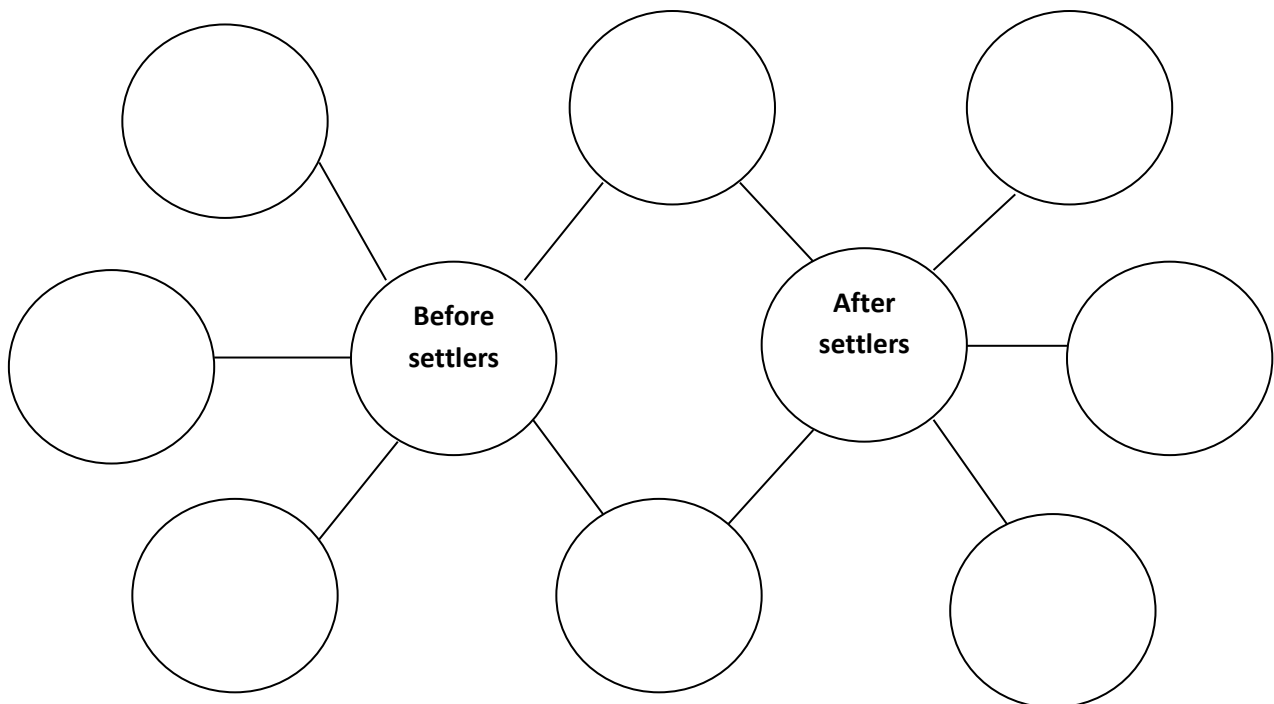
Students will read one of the following passages about the prairie and then filter the information into the corresponding thinking map to help focus their ideas. The thinking maps and transition words in the paragraphs encourage students to compare and contrast, sequence, and think about causes and effects. A key of suggested answers is provided at the end for teachers to use.



## 1. Destruction and Restoration of the Prairie

Two hundred years ago the prairies were almost completely covered by tall grasses. Herds of bison roamed the area eating the lush grasses. Native Americans lived on the prairie land without harming it. Almost no trees grew on the prairie due to bison trampling of seedlings and wildfires started by lightning and Native Americans. Prairie fires actually helped the tall grasses grow and prevented trees from growing. Then, European settlers arrived on the prairie from the eastern United States, causing many changes that damaged the prairies.

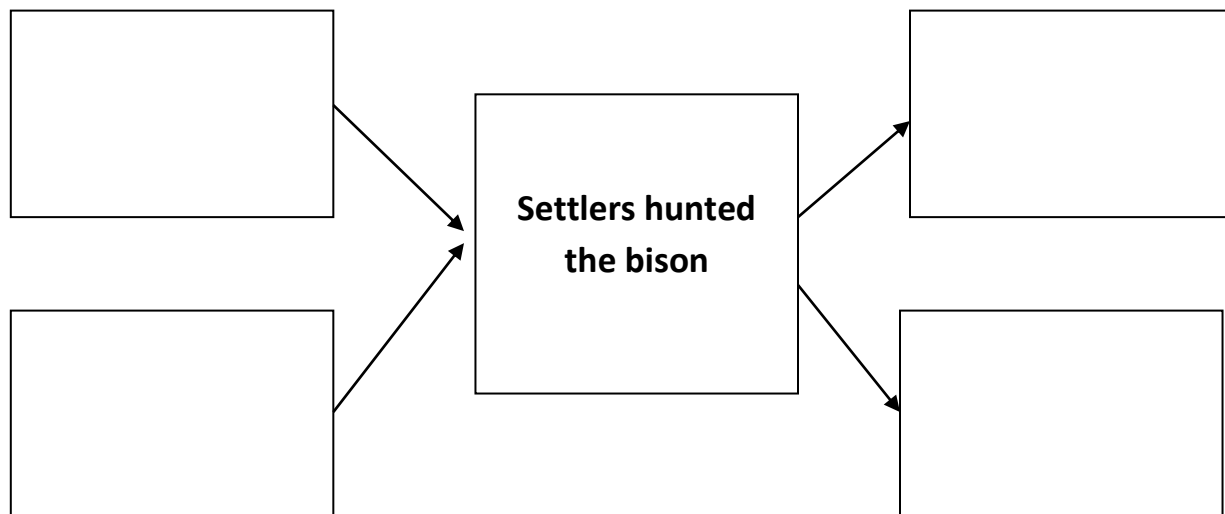
Their first major impact was hunting of the bison, which were slaughtered almost to the point of extinction. The settlers also prevented prairie fires which had been an important part of keeping prairie grasses healthy. Cattle were brought in to graze on the land, and then the prairie was plowed up to plant crops. The settlers probably did not realize how their actions would harm the prairie ecosystem. People are now beginning to realize the importance of the native prairie, and have begun studying ways to restore it.



## 2. Disappearing Bison

When settlers came to the west, the number of bison they saw on the prairie astounded them. It is estimated there were up to 50 million bison living on the prairie. Some herds contained tens of thousands of animals. The bison lived in herds to protect themselves against predators such as wolves. Individual bison were safer in herds than they would have been alone on the prairie. These huge herds of bison quickly ate the food where they were and had to move on and migrate across the prairie. Since the bison moved from place to place, the grasses were able to grow back, just as grass does after being mowed. The tall grasses of the prairie adapted to being eaten once in a while, and this pattern actually helped the grasses grow.

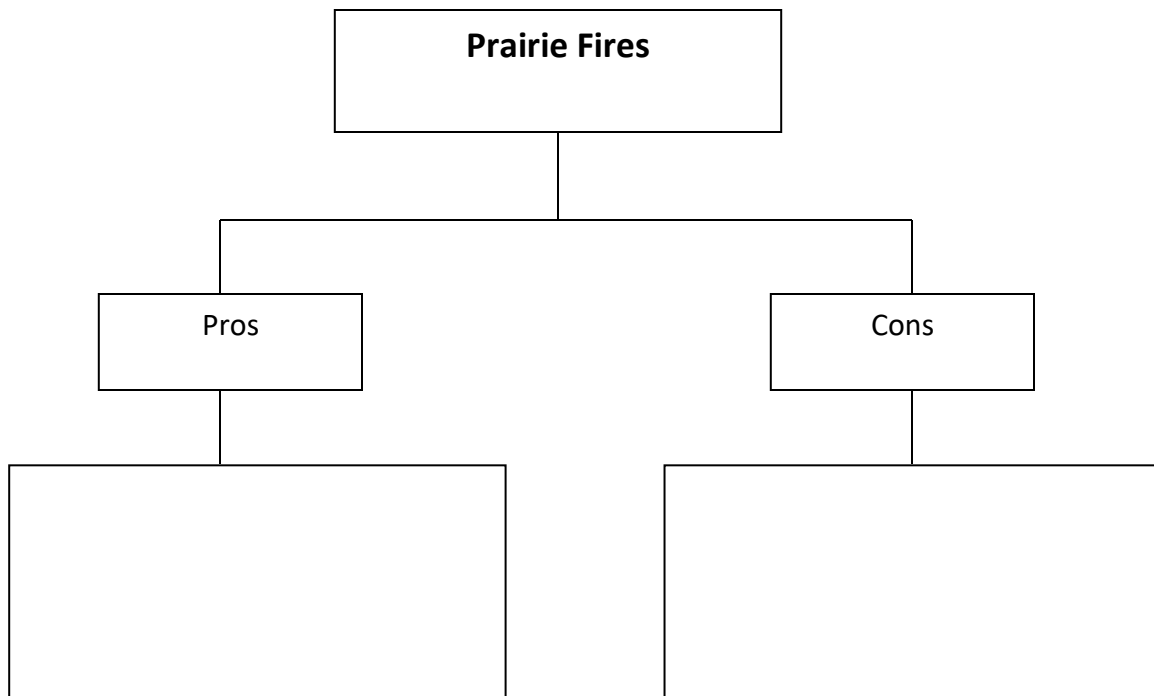
Hunters were attracted to the bison because their hides were valuable. The settlers began to hunt the bison in large numbers and shipped their hides back east to sell. They also hunted the bison for sport. Millions of bison were slaughtered by the settlers. By 1900, there were only a few hundred bison left. The elimination of the bison disrupted the native cultures, as the natives relied on the bison for many things. The farming and permanent settlements of the settlers and the loss of the bison caused the native grasses to decline and the Blackland prairie ecosystem was greatly damaged.



### 3. Prairie Fires Extinguished

Prairie fires can start easily, so they were common in areas with plenty of grass. Fires burning in tall dry grass could have flames 50 feet high! When fires were set by lightning they could travel almost as fast as the wind. Prairie fires such as these would often burn until they reached a river too large to cross. Prairie fires killed young trees, which is the main reason why trees were rare on the prairie. However, the tall prairie grasses are adapted to being burned. When old dry leaves were burned away, more sunlight reached the ground and new grass grew back quickly from the remaining, unharmed roots. Fires helped keep the prairie grasses healthy.

When settlers arrived on the prairie they began to try and control the natural fires. They did not want their homes, crops, and livestock burned by the fast-moving, raging fires. The settlers built fire breaks, places the fire could not cross, such as plowed fields and roads. As a result of stopping the fires, trees started growing in pastures. The tall grasses began to die off under the shade of the trees.

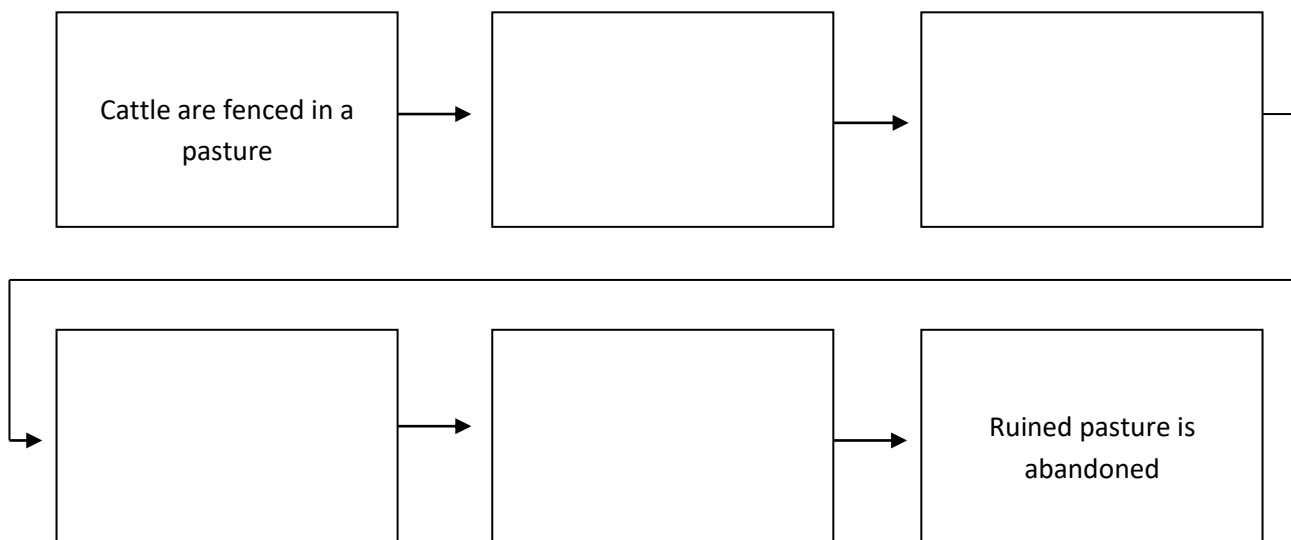


#### 4. Cattle Come to the Prairie

The tall grasses of the prairie were perfect for cattle ranchers because the grasses are very nutritious. At first, cattle were allowed to roam the prairie freely. However, after barbed wire was invented, people began fencing their animals to keep them from wandering and fencing their crops to keep cattle out. The cattle were forced to stay in one area to graze. They quickly ate the native tall grasses. Ranchers called these nutritious tall grasses “ice cream” grasses because they were the best tasting and cattle ate them first. Unlike ice-cream, however, they were not just the cattle’s favorite food, but also the best food for them.

Cattle that are kept inside fences search the same area over and over, choosing what they want to eat. As a result, cattle eat the good grasses and leave plants they do not like. These undesirable plants are then left to take the place of the good grasses. This is called overgrazing, where the good grasses are grazed more than they can stand and begin to die out. Then the pastures fill up with the plants the cattle won’t eat, such as thorny trees, poisonous weeds, and cactus. Over time, the pasture becomes useless for raising cattle and it is abandoned.

Today, many ranchers work hard to learn ways to manage their cattle so the cattle do not destroy the land. Some ranchers have even found ways for cattle to help the native grasses return. This is good for the rancher, the cattle, and the prairie.



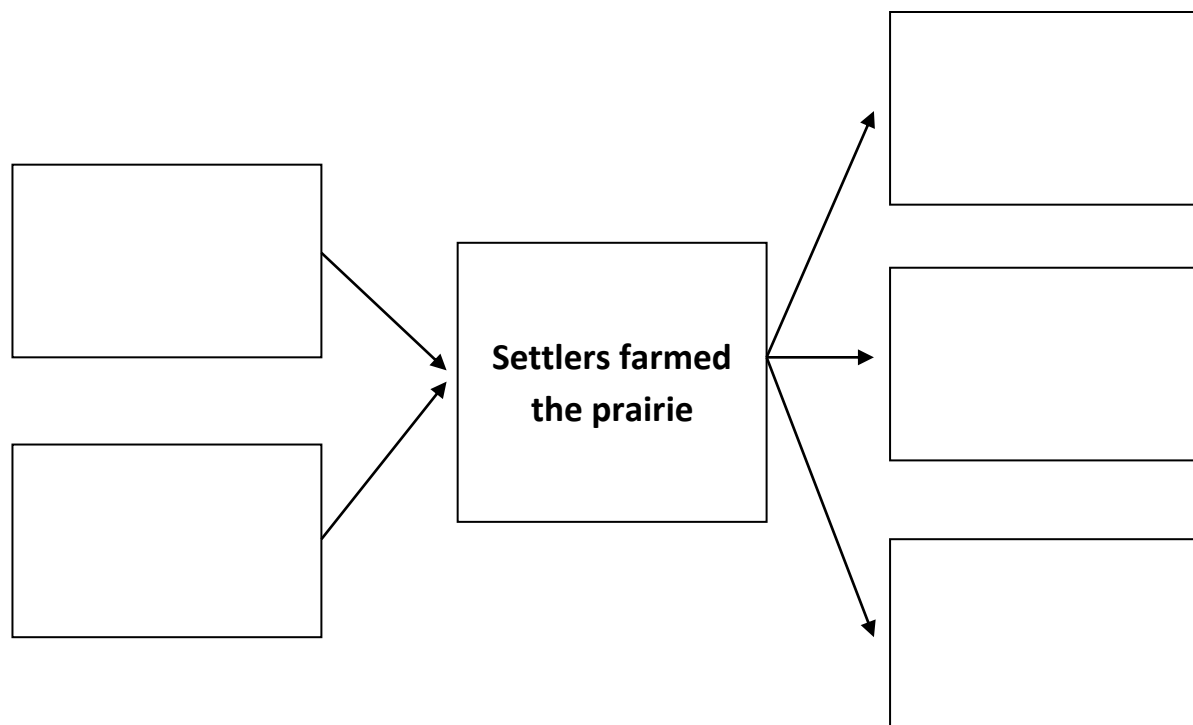


## 5. Prairie Agriculture

The first European explorers thought that the prairie lands must be as useless as deserts because no trees grew there. It did not take long for the settlers who arrived later to realize the prairie soils were incredibly fertile and rich in nutrients. At first there were no plows that could cut through the tough roots of the native perennial grasses. Eventually plows that could cut the sod were invented, and settlers began to farm the prairie. To farm an area, people had to remove the native plants and plow the soil, destroying the natural prairie ecosystem.

Farmers plowed the land, clearing fields of the native tall grasses. They farmed in order to make money and to grow food to feed their families. The most common crop was cotton. The farms of the Blackland Prairie region produced the most cotton of anywhere in the world for 70 years. However, nutrients in the soil were lost to erosion that occurred when heavy rains fell on bare soil and washed it away. Strong prairie winds also blew the loose soil away. Such erosion did not occur when the native perennial grasses grew on the prairie. Their deep roots held the soil in place.

Farming led to the destruction of native grasses and did terrible damage to the prairie soil. Many farms were eventually abandoned because the soil had lost too many nutrients to grow crops and the annual crops did not have deep enough roots to grow in the drought years of the 1950s. Many of these lands became pasture for cattle, and then were abandoned again when they were overgrazed. Some farmers and ranchers are working very hard now to stop erosion and the damage it does to their fields. They are developing techniques to preserve the soil and its nutrients and restore the plants.



## 6. Consequences of Prairie Loss

There are four major consequences that result from the destruction of the prairie and its native tall grasses. First, native species were lost. When the tall grasses disappeared, native animals that depended on the grasses also disappeared. Small animals such as prairie chickens and the predators that fed on them disappeared along with the bison.

Second, the loss of prairie grasses resulted in less nutritious food for cattle. The native tall grasses are now rare or completely gone from most ranches, and in many cases they have been replaced by plants that cattle cannot or will not eat. This makes it difficult for cattle ranches to make money since they must spend more money bringing hay in for their cattle.

Third, water washes off during storms rather than sinking into the ground where it can slowly and steadily supply wells, streams, and rivers. The tall native prairie grasses made it easy for water to sink into the soil where it could reach underground aquifers and water the deep roots of perennial plants. The groundwater was also released slowly to streams so they flowed continuously. Now, with the prairie grasses gone, rainwater runs off quickly. There are more dangerous flash floods, underground water sources are not refilled, and streams do not receive the water they need to keep flowing. Little water is soaked into the ground where it can be used by plants.

Finally, the running water also causes soil erosion. The tall perennial grasses that lived on the prairie had thick, deep roots that held the soil during heavy rains. However, the annual plants that have now replaced the perennials due to farming and overgrazing have very short roots. As a result, these annual plants cannot hold water or soil as well as the perennial plants did, so the soil is washed away.

The eroded soil gets washed into rivers and streams then to reservoirs and into the Gulf of Mexico. The soil takes the place of water in the reservoirs, reducing the amount of water reservoirs can store. The soil that is washed into the Gulf of Mexico causes oxygen to be used up and can leave the water unsuitable for fish.

These events are taking place slowly, and many scientists are trying to find ways to stop and reverse the damage soil erosion has done.

### What are the main ideas of this passage?

1. \_\_\_\_\_

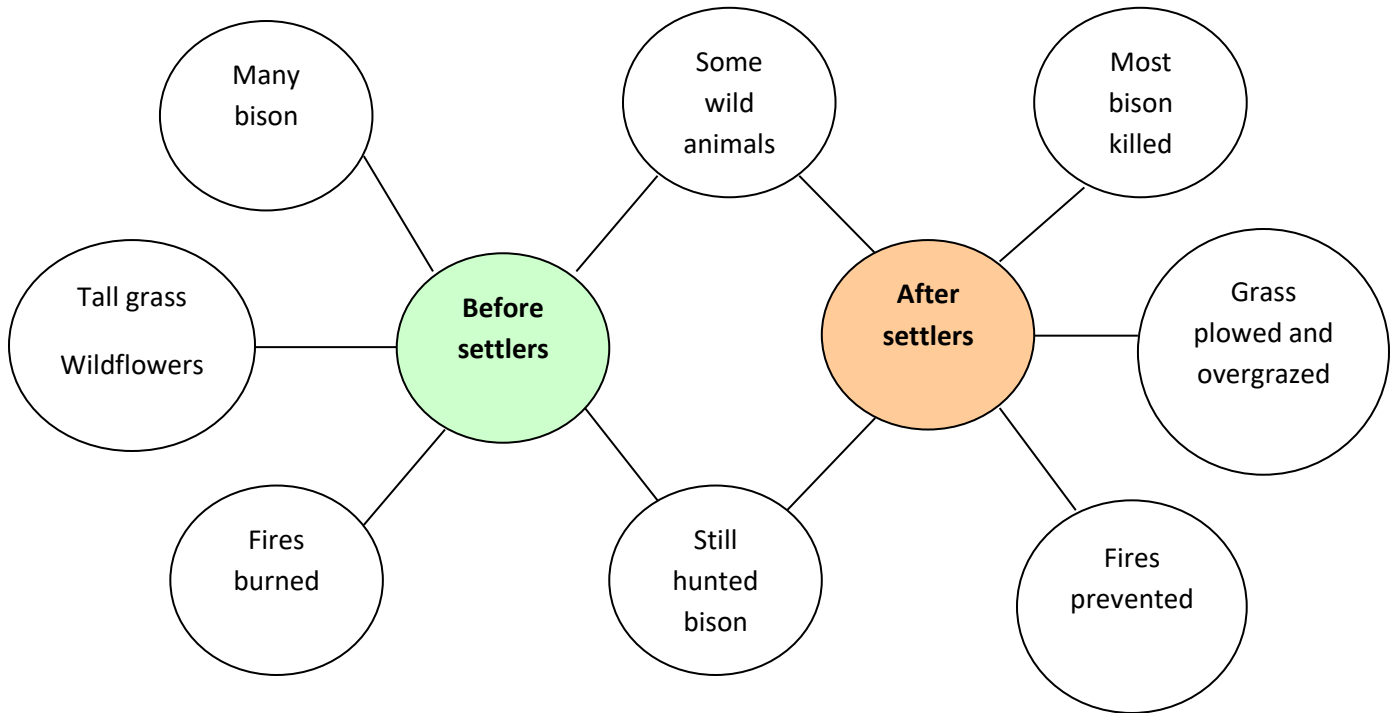
2. \_\_\_\_\_

3. \_\_\_\_\_

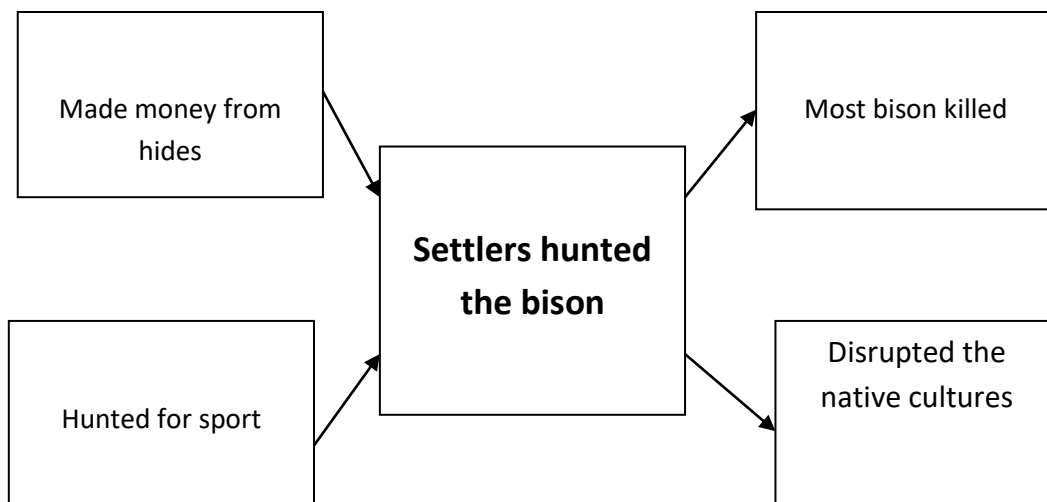
4. \_\_\_\_\_

# Reading Passages & Thinking Maps Key

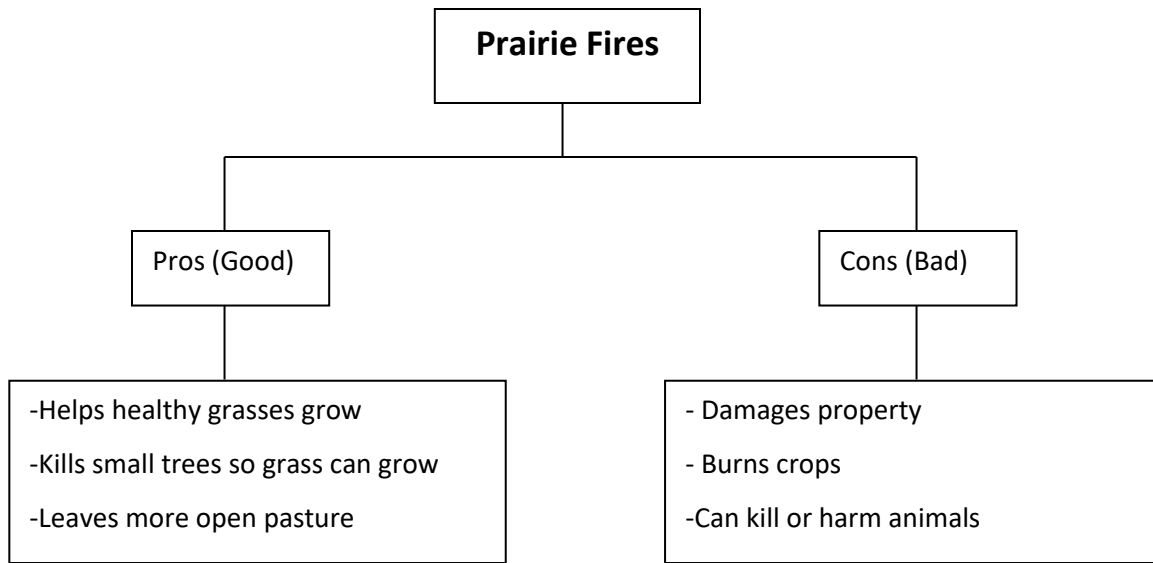
## 1. Destruction and Restoration of the Prairie



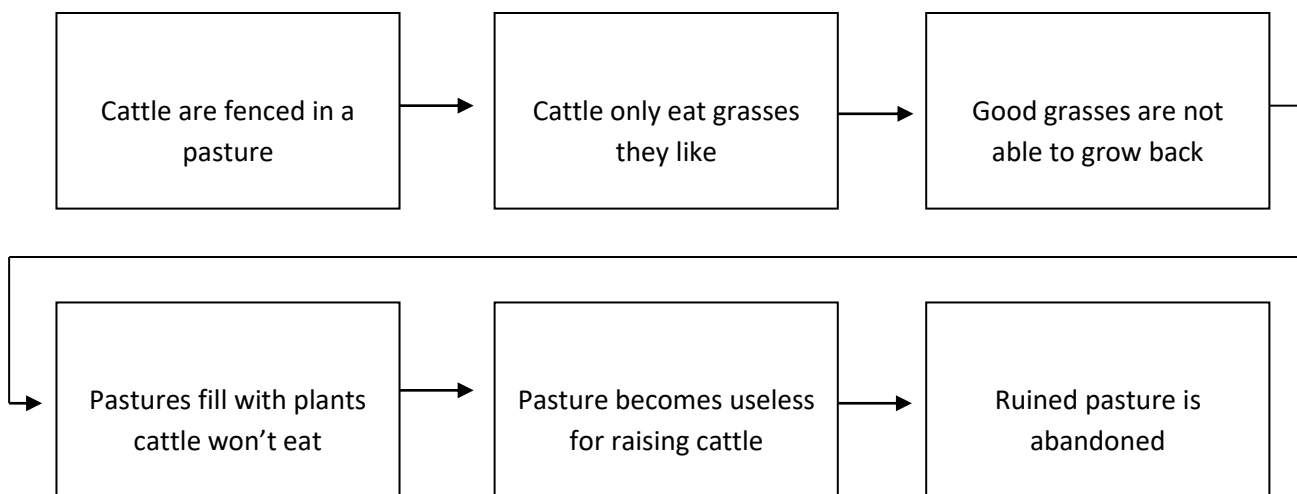
## 2. Disappearing Bison



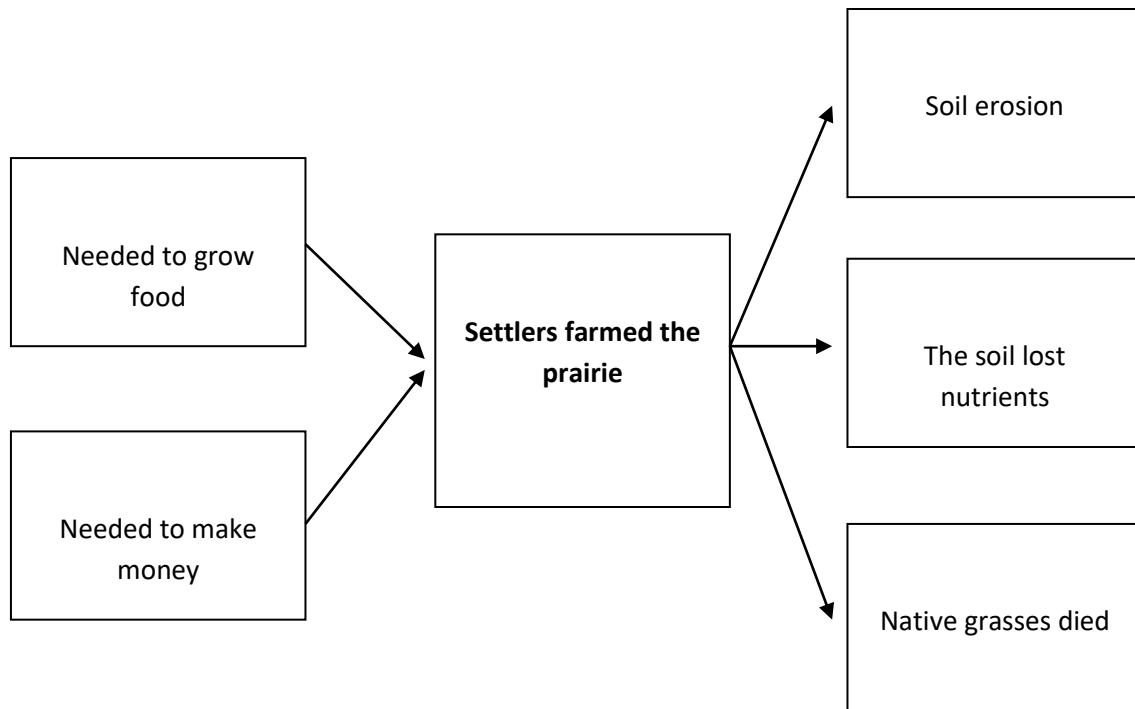
### 3. Prairie Fires Extinguished



### 4. Cattle Come to the Prairie



## 5. Prairie Agriculture



## 6. Consequences of Prairie Loss

### Main Ideas

1. Native plants and animals are lost.
2. There is less grazing for cattle.
3. Less water is absorbed into the ground.
4. Soil erodes and is washed into streams, rivers, and lakes.

## Suggested Reading List

Many schools participating in the field trips have been given these books for their school libraries so that teachers and students may check them out.

*A Walk in the Prairie* by Rebecca Johnson

*A Walk in the Boreal Forest* by Rebecca Johnson

*A Walk in the Deciduous Forest* by Rebecca Johnson

*A Walk in the Desert* by Rebecca Johnson

*A Walk in the Rain Forest* by Rebecca Johnson

*A Walk in the Tundra* by Rebecca Johnson

*Backyard* by Donald Silver

*Brother Eagle, Sister Sky: A Message from Chief Seattle* by Seattle and Susan Jeffers

*From Seed to Plant* by Gail Gibbons

*How Much is a Million* by David Schwartz

*Little House on the Prairie* by Laura Ingalls Wilder

*Sarah, Plain and Tall* by Patricia MacLachlan

*Skylark* by Patricia MacLachlan

*The Big Rock* by Bruce Hiscock

*The Buffalo Hunt* by Russell Freedman

*The Lorax* by Dr. Seuss

*Where the Buffaloes Begin* by Olaf Baker

## Sneed Prairie Glossary

**Adapt:** to change

**Annual plant:** a plant with short roots that grows for one season then dies

**Aquifer:** an underground source of water

**Ecosystem:** a system formed by plants and animals that depend on each other to live

**Erosion:** when soil is lost due to rain or wind

**Fertile:** able to produce plants and crops

**Migrate:** to move from one place to another

**Native:** originally belonging to a place

**Nutritious:** healthy, good for a person or animal to eat

**Perennial:** a plant that grows for more than one season

**Predator:** an animal that hunts another

**Reservoir:** an above ground area for collecting water