

Grade 6 Power Point Vision Story: Home Place Saskatchewan

Photos are needed to illustrate the narrative.

Time Allocation

15 minutes

Curriculum Support: DL 6.2e, DL6.4 c, f

- To learn how aspects (interconnectedness, value of place-based knowledge) of First Nations worldviews shape affect the understanding of living things.
- To describe examples of structures and behaviours that help living things survive in their environment, including seasonal changes
- To suggest reasons why certain species could become endangered or extinct

Narrator: First Nations teenager

Slide 1: Home Place Saskatchewan

Slide 2: Thank you to _____ for narrating this story.

There are a lot of people who call Saskatchewan home. Some have been here for a long time. Some have moved here very recently. One thing everyone learns quickly is how to survive the weather. Bundle up for the cold. Keep cool in the shade. Long cold dark winters, short hot summers—many people in the world would say no thanks to our extreme climate.

Prairie people like to talk about the weather. We complain about the cold but then say it a dry cold which makes it easier somehow. The wind is a big topic and there's a saying that the wind blows so hard that people almost fall over when it stops. The funny thing is that it's true. There may be years of drought, and then flooding can be a problem.

Our extreme climate is probably one of the reasons why Saskatchewan people are known for their friendliness—neighbours helping neighbours or complete strangers. There's a strong community spirit.

We also belong to another community that's filled with prairie spirit. This is our home place: the big sky painted with spectacular sunsets or dotted with hundreds of geese; the rolling landscape and deep coulees. Our home place includes all the native plants

and animals that have lived here for thousands of years. They have had to deal with cold winters, strong winds and drought, just like we do.

Twelve thousand years ago, the great ice sheets that had covered most of Saskatchewan melted and the climate became drier. Not enough water for trees so grasses grew with leaves that bend with the wind. In drought or winter, the grasses die back, the dried parts like a blanket on the ground, protecting the living buds.

Bison prospered and soon millions and millions of them thundered across the grasslands, grazing and then moving on. They were adapted to prairie living, with great shaggy coats to keep them warm in the winter and flat teeth to grind native grasses year round. The prairie was alive with diversity of life. Mule deer and pronghorn antelope, along with plains grizzly bears and prairie wolves roamed the prairie.

But it was the bison that brought First Nations onto the prairie. There were no horses or guns in those early days so hunting bison was hard dangerous work and needed all the people working together. The bison provided food, thick hides for shelter, shoes and bedding, bones for tools, hair for ropes and dried dung for fueling fires in a treeless land.

Without the bison, the First Nations could not survive and so they followed the herds onto the plains in the summer and into the parklands and valleys during the harsh winter. When the bison were scarce, people starved. The bison and the people were of one spirit and so the bison was treated with great respect.

The land, water, plants and animals were all respected. The people knew that their lives depended on their relationship with nature and that they were part of nature—not apart from it. Stories, ceremonies and personal spiritual journeys connected the people to the prairie and reminded them to honour what gave them life. Water, grass, bison and people are all part of the circle of life.

The more you look at prairie, the more life you see. There's dozens of native grass species. If you knew what to look for, you would see that each looks different: some are short, others tall; the leaves have different shapes and colours. Many grasses grow and flower at different times so the prairie is always changing.

It's not just grasses that are adapted to prairie life. The flowers of the western spiderwort bloom for just a day as they hug the southern sand dunes. Two kinds of roots, slender and thick, help conserve moisture in the shifting sands. Buds, formed in the fall, quickly produce new plants in the spring when it's wetter.

You usually only see moths at night, but Verna's flower moth is a buzzing daytime flier. It lives where prairie grasses are sparse and grazed which is the right habitat for pussytoes, its only food plant, to grow. Verna's flower moth spends most of its life as a pupa at or below ground. The adult moths emerge from pupae in the spring and only live for one to two weeks. Single eggs are deposited in the flower heads of pussytoes.

Once the eggs hatch, there's only about three weeks for the caterpillar to grow before turning into pupae for the rest of the year. That's one way to beat drought and cold!

You wouldn't expect to find an amphibian in dry open grasslands but the Great Plains toad is adapted to this habitat. Days are spent hiding in the shade; nights are for hunting insects and spiders. When it's too dry or cold, this toad heads underground. They back into soft ground, shuffling their bodies and kicking out soil. In the winter, the Great Plains toad must burrow below the frost line if it is to survive.

Across open southern prairie where grasses are sparse and short, a swift fox can run like the wind. Speeds of over 50 kilometers per hour sometimes helps the swift fox catch a jack rabbit although most of the time this night hunter feeds on grasshoppers, mice or dead animals. It uses dens on slopes and hill tops all year round for protection from the weather and predators. When you are a cat-sized fox living in sparse grasslands, you need to hide from hawks and eagles!

Owls nest in trees but on the treeless prairie, the little burrowing owl heads underground for protection. Foxes, badgers and ground squirrels do the hard work of digging burrows for themselves. But when they move out, the burrowing owl moves in—especially when there is a nice open view of open grassland with patches of short and tall plants. There they can run around on their skinny long legs, hunting grasshoppers and beetles by day and mice by night. Burrowing owls escape the winter by flying south.

In the late 1800s, millions and millions of bison were killed by hide hunters, settlers and those who killed just for fun, to the point that bison almost went extinct. There was little food for First Nations and their civilizations began to collapse, as did the native prairie.

The native prairie was broken and agriculture took over. It was easy to plow up the native prairie grasses and grow large crops of grain in the fertile soil. The prairies become known as the bread basket of the world. The settlers worked very hard to make a living and to develop communities. Many came from lands with gentle climates and different cultures so it was a shock to settle in the land of living skies and open space.

Nowadays, Saskatchewan is booming. We are a resource rich province and our cities are growing larger and need more space. Farms and ranches are getting bigger and more efficient at producing food. First Nations are rebuilding their cultures and defining their roles. People from all over the world are coming to live in Saskatchewan.

Despite where we come from, the prairie affects us. We all look up when we hear the geese returning in the spring. We grumble about the weather—too hot, too cold, too dry too wet, but the prairie is our home place and helps make us who we are. That means we have a relationship with the native plants and animals who also call the prairie home place.

But not much native prairie has survived. Only about 20 percent of native prairie is left in Saskatchewan now and we keep losing more. Most bison are now kept as livestock.

The western spiderwort, swift fox and burrowing owl are all endangered in Saskatchewan. Verna's flower moth is threatened and the Great Plains toad is of special concern. We are losing the diversity of native prairie life.

When native prairie is lost to agriculture, urban expansion or road development, it's easy to see. What's harder to see is what is happening to some of the native prairie that's left. That's because it's a green invasion of non-native plants. These super weeds can grow and reproduce so quickly that they take over native prairie and upset the balance of nature.

This is a pretty plant—it blooms from spring to fall with cheery daisy-like flowers but don't let appearances fool you! Scentless chamomile is a super weed from Europe. All those flowers produce seeds that quickly sprout and grow into new plants. Seedlings in the fall will overwinter and then burst into flower in early spring. One plant can cover a square meter and produce up to one million seeds. It's adapted to quickly take over places where the soil is exposed.

Don't touch the sap of leafy spurge—it might cause a skin rash! Cows don't like to eat it as it blisters their mouths and might make them sick. This European plant is spreads from seeds and by sending up shoots from its large creeping root system. It's really hard to get rid of it.

Canada thistle is not Canadian—it comes from Europe. Lots of people have been poked by this plant's sharp spiny leaves through their socks. This super weed forms a dense colony, aggressively displacing native plants in overgrazed or disturbed areas. Along stream banks and wetlands, the thistle takes the place of native plants that wildlife need for food or that ducks need for nesting cover.

The diversity of life on native prairie helps keep our home place of Saskatchewan healthy. Native prairie is home to plants that are adapted to our extreme climate. The plants provide habitat that prairie animals need to survive. The land, plants and animals fit together and work as a unit, providing us with healthy water and soil resources. It's part of the circle of life.

The diversity of life of native prairies is also a source of beauty and inspiration. It provides us with lessons from nature that help us understand our relationship to the natural world. We are part of the prairie not just living on the prairie.

That means we have a personal responsibility to our home place to keep it healthy. Our everyday actions have an impact. Everyone can make a difference. Reducing our consumption of energy, water and goods, reducing our wastes and caring for our native prairie resources are practices that connect us to each other and to the environment. It makes the world a better place.

Grade 6 Activity: BFF - Bison and Grasses

How have bison and grasses co-evolved and adapted to the prairie environment?

Time Allocation

20 minutes

Curriculum Support: DL 6.4a, b, c, d

- To propose questions to investigate the structures and behaviours that help organisms survive in their environment.
- To show curiosity in learning about organisms' adaptations to different environments by sharing science-related information about adaptations with classmates
- To describe examples of structures and behaviours that help living things survive in their environment, including seasonal changes, during the lifetime of the organisms
- To describe examples of adaptations to structures and behaviours that have enabled living things to adapt to their environments in the long term

Supplies

- A large photo of a bison in profile
- Bison skull with some teeth
- A piece of hide, preferably from the hump to show longer hairs
- A foot would be great
- A large photo of a prairie grass with seed heads and roots or better, a dried clump with flowers (seeds) and roots (or both photo and specimen)
- Board space, chalk/markers

Methodology

1. Show students the bison poster. Ask students to generate a list of specific questions about the physical appearance of the bison (structural adaptations). Write the questions on the board. Don't answer the questions.
2. Ask students to generate another list of questions about the bison, this time about things that they would like to know about bison or about how they can survive in Saskatchewan's extreme climate. Write these down as well.
3. Go through the questions and solicit answers from the students. Try to have them figure out function of the structures. Use Bison Adaptation Talking Points to augment the discussion. Watch the time. You will not have time to cover all the talking points. Use the specimens to illustrate different points. Let students handle the specimens. Connect physical adaptations to behavioural ones.

4. Show the students the grass. Ask the students to generate a list of specific questions about the physical appearance of the grass. This will be more difficult for the students. Use the Prairie Grass Adaptations Talking Points for prompting, if necessary. For example, how is a grass leaf different from a maple leaf? Have a short discussion as for the bison.

6. Ask students if they knew why bison (and now cattle) and native grasses are BFF (best friends forever).

7. Ask students what are their connections to prairie grasses and bison (and cattle). Use the Human Talking Points to augment this discussion. Conclude that grasses, bison, cattle and human are all joined in the circle of life.

Bison Adaptations Talking Points

- Bison behaviour is attuned to harsh cold winters and hot, dry summers
- Plains bison traditionally migrated hundreds of kilometers to feed on seasonally available grasses
- Traditional migration routes are still visible from the air as deep worn paths
- Unusual body shape is at least a partial adaptation to foraging in snow
- The hump is all muscle that is attached to spines on the upper vertebrae. The spines may be up to 50 cm long in an adult bull.
- The muscles are used to swing the neck and head from side-to-side to clear snow from ground so that they can eat.
- Move into the wind during blizzards (cattle drift with the wind and are sometimes crushed when they pile up against fences).
- The two toes of the cloven hoof are homologous to our third and fourth fingers so a bison runs on the tips of its toes! Compare the back leg of the bison to a human: Locate the high-up knee on the bison photo which points forward just like ours; the section below is similar to our calf and shin segment, the joint below this segment is called the hock on a bison and the ankle on humans. Everything below the hock is homologous to a human foot. Some bones have been lost (less weight), others are fused and elongated (longer stride). The leg and foot are adaptations for running fast.
- Can run over 55 km/h in short distances and can pivot quickly to protect hind quarters from a predator. Calves can follow mothers just a few hours after birth.
- Excellent sense of smell; can distinguish smells three km away.
- Keen hearing
- Eyes are located on the side of the head for greater range of view to look for predators. (Predators tend to have eyes in front for depth perception.) Eyesight is excellent and they can spot moving objects almost a kilometer away.
- Curved horns are used for defense and establishing status in a herd. The skulls are padded with a thick pad of flesh to absorb shock when bulls fight over females. The material covering hooves and horns is made of keratin, same as our fingernails.
- Thick winter coat (long coarse guard hairs over a matted woolly undercoat) protects from cold, with the heavy mane offering extra protection for vital organs.
- It takes about two months before a new coat grows, so they are very irritated by flies in the summer. Bison rubbed against trees and rocks to remove shedding hair and to soothe insect bites.
- Bison wallow in wetlands and dust bowls when their winter coat is shed to escape from flies.

- Like a cow, a bison is a ruminant so it has similar feeding behaviour: feeding, then resting and chewing the cud. Plants are eaten; then the semi-digested food (cud) is regurgitated from the rumen and chewed again to break down the plant matter more before it is swallowed for the last time. The rumen contains an enormous diversity of life (bacteria, protozoa) that can break down grasses in ways bison can't (symbiotic relationship). This is how bison can eat grasses (and twigs in winter) - plants with lots of fiber and a low nutritional level.
- Flat cheek teeth have vertical crescent-like folds of hard enamel that aid in grinding food.

Prairie Grass Adaptations Talking Points

- Prairie grasses can be classified according to their height and time of growth (early, mid, late). These differences allow the diversity of grasses to co-exist as they occupy different niches.
- Grass flowers, protruding above the leaves, are wind pollinated; the different shapes of the flower heads show different strategies for controlling air currents to maximize fertilization.
- Unlike most plants, grasses grow from the base, not from the tips.
- The growing buds are at or just beneath the surface protecting them from grazers (and fire or desiccation).
- Grass leaves are narrow so less water is transpired and pliant so they bend, not break when it's windy.
- Some grasses have roots concentrated at the surface to intercept any moisture (rain or snowfall); other have long roots to reach water deep in the soil. Up to 80 percent of some grasses may be beneath the surface.
- Plant litter (dead material) provides winter and summer protection for the grass buds, as well as erosion control by lessening the impact of raindrops on the soil and increased water infiltration.

BFF Talking Points

- Grass is the main food for bison and cattle on the range
- Grazing encouraged grasses species to grow that need to be surrounded by short vegetation.
- Plant litter quantity is critical for the survival of grasses (varies for ecoregions) - too little will cause erosion, heat the soil and decrease water infiltration; too much will decrease growth. Grazing at the right intensity maintains the right amount of litter. Cattle provide this service now.
- Dung is a source of fertilizer and helps build prairie soils.
- Healthy grasslands help conserve water and improve its quality – cattle need a lot of water.

Human Talking Points

- We eat beef and bison.
- Healthy grasslands conserve our soil and help conserve water and improve its quality.
- Healthy grasslands with grazers promote biodiversity.
- Healthy grasslands with grazers are beautiful and part of our culture.

Grade 6 Activity: Adaptation Charades

How are species at risk adapted to native prairie? How are invasive non-native species adapted to colonize native prairie?

Time Allocation

35 minutes

Curriculum Support: DL 6.4c, f

- To describe examples of structures and behaviours that help living things survive in their environment, including seasonal changes
- To suggest reasons why certain species could become endangered or extinct

Supplies

- One set of six laminated Adaptation Charades cards in a bag
- 6 large photos of the charade species
- Timer (can be a watch)
- Board space for writing, chalk or markers

Methodology

1. Introduce the rules

There will be eight teams (selected by the teacher)

Each team will, in turn, pick an Adaptation Charades card from the bag and leaves the classroom. They have one minute to plan their charade. (While they are out, use this time, for light discussion and stories, (e.g. who has ever been to a grassland, what was it like, who has eaten bison? What was it like?)

One student on each team is the Cardholder and Recorder. As the words are guessed, the Recorder writes the words on the board in the correct order, leaving spaces so that there is room for all the words of the completed sentence.

No speaking or mouthing words

They can act, draw on the board or point to objects

Do the easiest words first.

Review signals (they may use others):

- Sounds like: Cup ear with hand.
- Make a word longer: Move hands farther apart.
- Make a word shorter: Move hands closer together.
- Wrong train of thought: Shake head from side to side.
- Right train of thought but need a different word: motion come with hand

2. They have two minutes to solve the charade. This is not a competition.
3. After each adaptation charade is solved, asked students if it is a physical or behavioural adaptation and show the photo of the species
4. Do students remember which of these plants is invasive?
5. Explain how native prairie plants and animals have developed adaptations in response to their environment and to each other (just like the bison and grasses) – it's all about interdependency in the circle of life. All the components fit together. When invasive non-native plants colonize native prairie, the environment changes, so some animals can't survive as well.

Adaptation Charades Cards

Western Spiderwort:

Thick sticky sap plugs insect predator's mouth.

Verna's Flower Moth:

Caterpillars chew on pussytoes' flowers and seeds.

Great Plains Toad:

Spade-shaped knob on back feet shovels soil.

Swift Fox:

Heads underground on windy days all year round.

Burrowing Owl:

Cow pies line nesting holes to hide smell.

Leafy Spurge:

Dry pods explode, shooting seeds up to five meters.

Scentless Chamomile:

One million seeds sprout spring, summer and fall.

Canada Thistle:

Aggressive creeping roots can grow six meters deep.