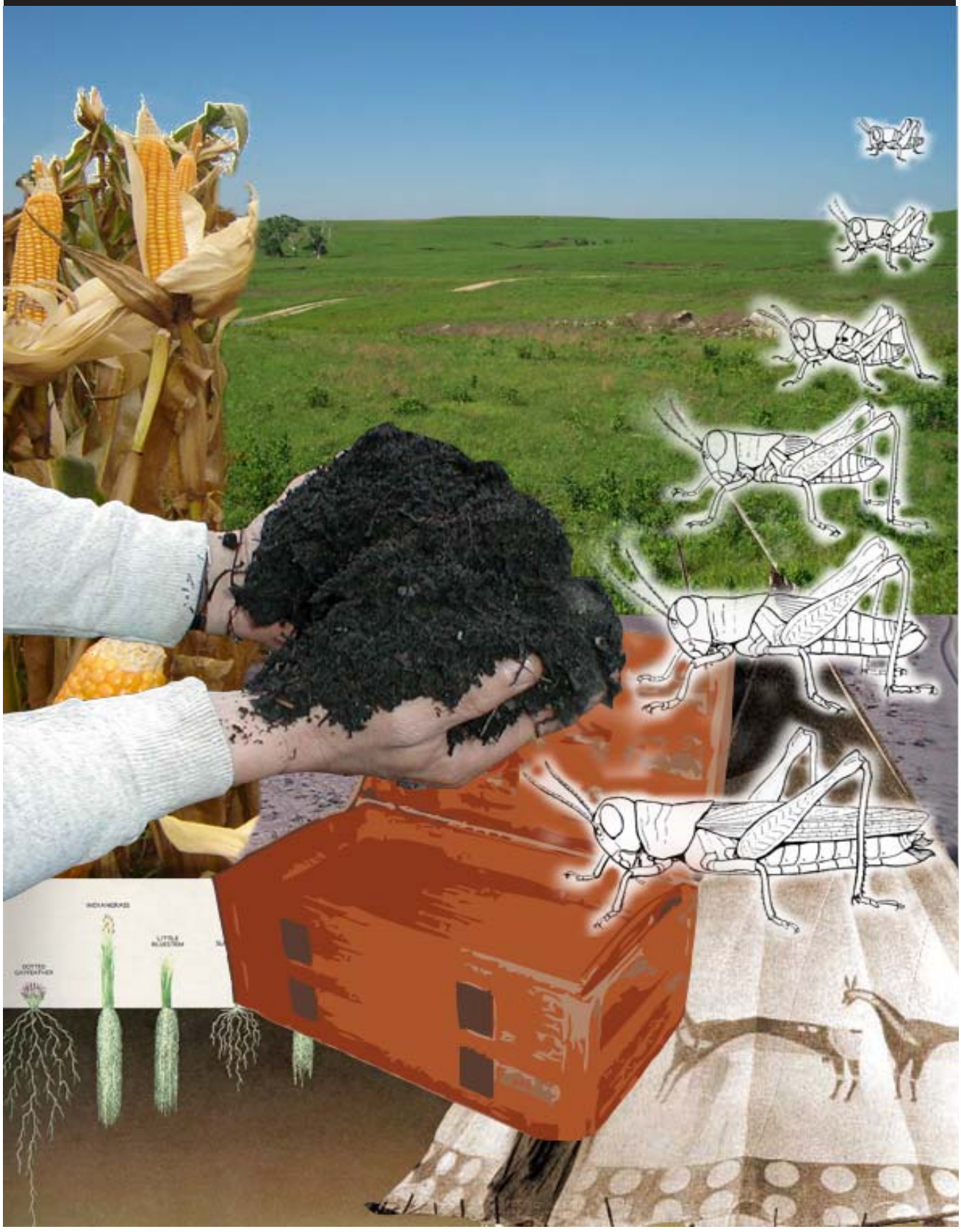
Recipe for Prairie



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How to Get Started

What does it take to make an ecosystem? Tallgrass prairie is an ecosystem that has existed in North America for the past 10-15,000 years. It takes several ingredients, working together in balance, to support an entire system. Take one ingredient away and you have something different. After all, an apple pie is hardly an apple pie if you have no flour, no apples, or no oven in which to bake it. Explore with your students the various ingredients that make the tallgrass prairie truly special.

Materials contained in this kit are geared toward grades K-2 and correlated to Kansas State Education Standards for those levels. However, you may use the materials in the trunk and this booklet as you deem appropriate for your students.

References to items from trunk will be in **bold print and underlined**. Graphics with a Figure Number referenced will have accompanying transparencies and digital versions on the CD. Watch for the following symbols to help guide you through the booklet:

Indicates a class discussion point and potential writing activity.

Indicates further resources on the Web for extension learning.

Math Counts! Exercise for mental or written arithmetic.

Vocabulary Counts! New vocabulary that may need reinforcement.

Community Counts! Opportunity for verbal interaction with community members.

Please help us continue to share these treasures with other students by treating the trunk contents with respect.

Good luck and enjoy!

All questions, comments, and suggestions are welcome and should be forwarded to:

Travelling Trunk Program
Tallgrass Prairie NPRES
Route 1 Box 14, Hwy 177
Strong City, KS 66869
(620)273-8494

Curriculum Standards (Kansas)

The activities and materials in this trunk have been compiled to meet curriculum standards for the State of Kansas Department of Education.

Science	**Std**	**Bench mark**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
Science as Inquiry	1	1		●	●	●	●			
Physical Science	2	1		●						
Life Science	3	1	●				●	●		
Earth and Space Science	4	1		●						
	4	2	●		●					
	4	3			●					
Science and Technology	5	1			●					
Science in Personal and Environmental Perspectives						●				
History and Nature of Science	7	1								
Social Studies	**Std**	**Bench mark**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
Geography		1								●
		3			**● (1st, 2nd)**					
		5							●	●
History		1							**● (K)**	
		2							**● (1st, 2nd)**	
		4							●	

Curriculum Standards (National)

National Science Education Standards	Standard A (Science as Inquiry): Abilities necessary to do scientific inquiry, Understanding about scientific inquiry. Standard B (Physical Science): Properties of objects and materials Standard C (Life Science): The characteristics of organisms, Life cycles of organisms, Organisms and environments Standard D (Earth and Space Science): Properties of earth materials, Objects in the sky, Changes in earth and sky Standard F (Science in Personal and Social Perspectives): Types of resources, Changes in environments.
National Center for History in the Schools	Standard 1A: The student undertands family life now and in the recent past; family life in various places long ago. Standard 2A: The student understands the history of his or her local community. Standard 2B: The student understands how communities in North America varied long ago. Standard 3E: The student understands the ideas that were significant in the development of the state and that helped to forge its unique identity. Standard 8A: The student understands the development of technological innovations, the major scientists and inventors associated with them and their social and economic effects.

Lesson A: Sunlight

Objectives:

- Students will learn that the sun powers all life on Earth.
- Students will learn the basic parts of a plant and what they do.

Materials:

____ Singing In Our Garden CD
____ *Food* tubs (2)
____ *Water* tubs (2)
____ *Air* tub
____ *Sun* tub
____ Bucket
____ Plastic cups (10)
____ Measuring spoons(3)
____ Sponges (5)
____ Blue food coloring
____ Yellow food coloring
____ Big leaf
____ Flower shoebox
____ Fishing poles (5)
____ Bees with pollen (10)
____ 20-foot rope
____ Root network

Curriculum Standards:

- Life Science B1, I4
"examines the structures/parts of living things"
- Earth and Space Science B2, I2
"describes that the sun provides light and warmth"

The sun is the fuel that powers all life on Earth. Besides warming us and providing us light to see by, sunlight makes plants grow. In fact, plants are the only things on Earth that can make their own food from sunlight, water, and air. This is called *photosynthesis*. Everything else on Earth (including humans!) has to get its energy from either plants or other animals.

Vocabulary Counts!
Photosynthesis

No matter what a plant looks like -- a sunflower, a blade of grass, or a tree -- it has special parts that work together to make food and give the plant what it needs.

Roots

Roots are like straws that go down into the ground to suck up water from the soil. In places like Tallgrass Prairie where there are lots of rocks and long periods of time with no rain, roots sometimes have to go way, *way* down to get water.

Stem

The stem of a plant holds it upright, moves water from the roots to the rest of the plant, and moves food from the leaves to the rest of the plant. It is like a train track moving cargo up and down the plant.

Leaves

Leaves are food- making factories! No matter whether they are skinny or fat or big or small, all leaves turn sunlight, water, and air into sugars that the plant uses to grow.

Flowers

Flowers make seeds which turn into new plants. Sometimes the flower turns into a fruit which attracts animals.

Adapted from Canyon Country Outdoor Edcuation Program (http:www.nps.gov/cany)

Introduce the actions that the students will do along with the song "Roots, Stems, and Leaves" on the **Singing In Our Garden CD.**

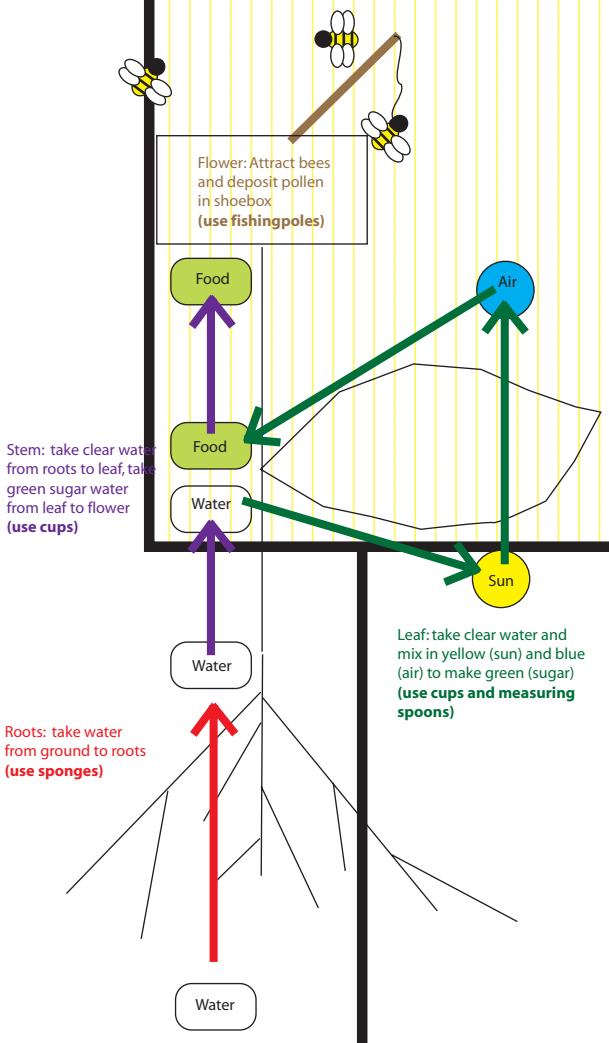
Roots - Shake your feet.
Stems - Keep arms at your sides and wiggle your body.
Leaves - Put your arms out and shake your hands.
Flowers - Place your hands on your head in a flower shape.
Fruit - Twist your hands like you're holding a ball.
Seeds - Wiggle your fingers as you lower your hands to the ground.
Six plant parts - Hold up six fingers first to one side and then to the other.

Adapted from Canyon Country Outdoor Education Program (http:www.nps.gov/cany)

Ever wanted to shrink down and crawl inside the food- making factory of a plant? Try this.

Set up in advance a giant plant with four stations at the locations of the roots, leaves, stem, and flower.

Use the **20 -foot rope** for the stem, the **flower shoebox** at the end of the stem, the **big leaf** on the stem, and the **network of roots** at the other end of the stem. Place a ***water* tub** with just a few inches of clear water in it within the roots network. Place **sponges** and a full **bucket** of water just outside the roots. Place six **clear plastic cups** at the stem. Place **four tubs, labeled *air*, *sun*, *water* and *food***, at the leaves. Fill the *air* tub with water dyed **deep blue and a measuring spoon** and the *sun* tub with water dyed **deep yellow and a measuring spoon**. Put a few inches of clear water and a **measuring spoon** into the *water* tub. Leave the *food* tub empty. *Air* and *sun* tub should be away from the leaves, but in the same general area. Place an empty ***food* tub, magnetic fishing poles, magnetic bees and pollen circles** at the flower.



Have the class "shrink down" to the size of a drop of water. Divide into four groups and assign each group to a different part of the plant -- the roots, the stem, the leaves, and the flower. The students will work the job of that part of the plant. After five minutes, switch. When every student has been to every station, come back together and "unshrink."

Figure A1 (Big Plant Digram)

Lesson B: Dirt

Objectives:

- Students will understand that soil is home to many organisms
- Students will understand that there many types of soil.
- Students will relate the quality of soil with human uses.
- Students will practice observation and classification skills.

Materials:

____ Garden soil
____ Sand
____ Clay
____ Flint Hills topsoil
____ Blindfolds (4)
____ Corn
____ Wheat
____ Soybeans

Curriculum Standards:

- Science as Inquiry B1
"classifies and arranges groups of objects by a variety of properties, one property at a time"
- Physical Science B1
"observes properties of objects and measures or describes those properties using age -appropriate tools and materials"
"separates or sorts a group of objects or materials by properties"
- Earth and Space Science B1
"observes, compares, and sorts earth materials"

Figure B1(Dirt)

Dirt is more than just stuff that gets caught in your shoes. Dirt is where plants grow. Dirt is where animals like gophers and badgers live. Dirt is what earthworms eat. Dirt is also called *soil* and is made from the *decomposition* of old plants and the breakdown of minerals in rocks. Different kinds of habitat and geologic areas produce different kinds of soils. Tiny creatures called *microorganisms* turn old plant matter and rocks into dirt. The kind of dirt they make depends on the kinds of plants and rocks they have to work with.

Vocabulary Counts!
Decomposition
Microorganisms

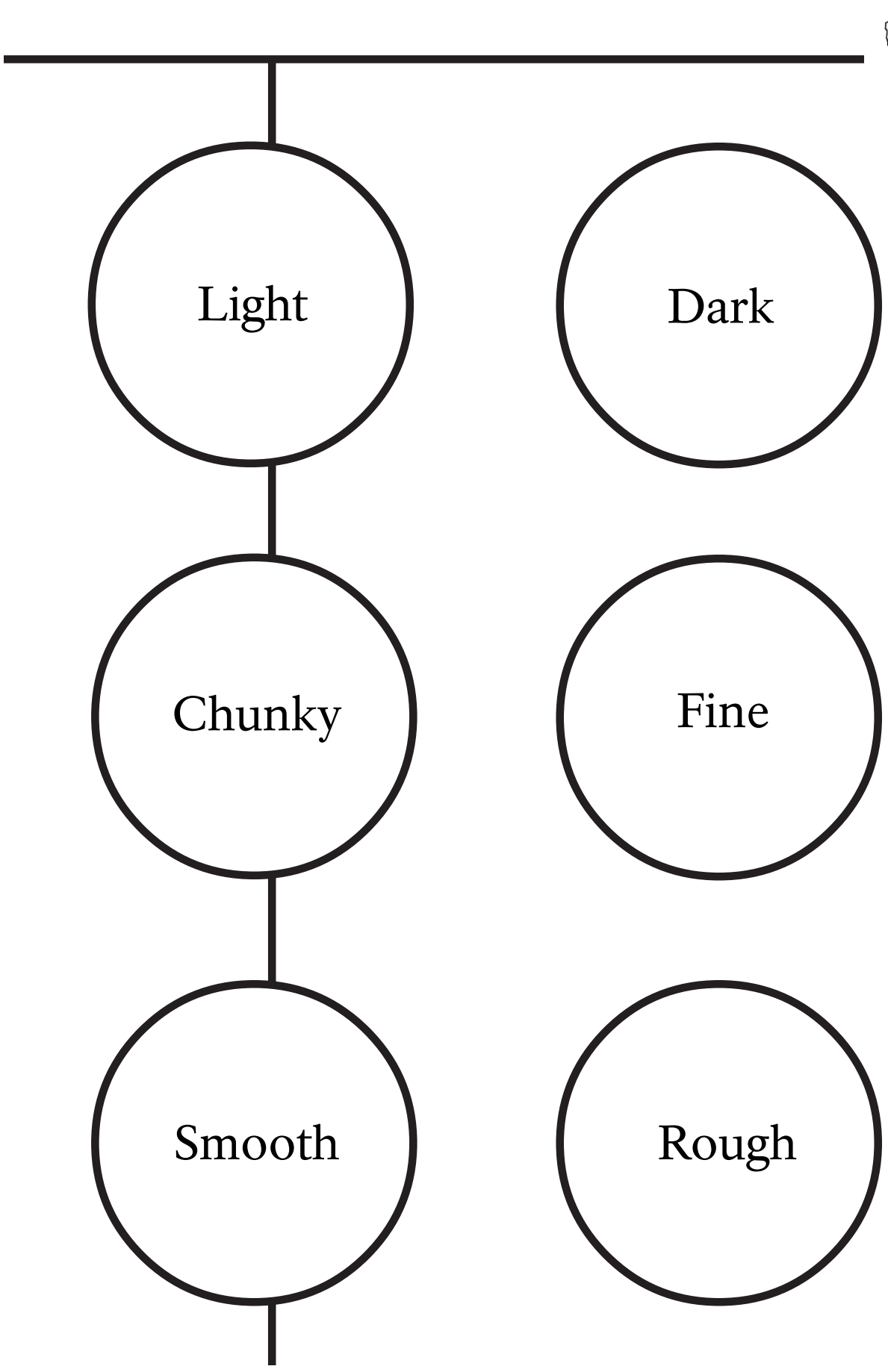
Some dirt has lots of dead plants in it.
Some dirt has lots of sand in it.
Some dirt is sticky like clay.
Some dirt has lots of rocks in it.

Take out the **four tubs of dirt -- garden soil, sand, clay, and Flint Hills topsoil**. Let the students explore with their eyes, their hands, and their noses. (Try to keep them from tasting the dirt!)

Explore the soil tubs while **blindfolded**. Can you guess which soil is which by touch alone?

How many different words can you use to describe the 4 types of soil? (Think of color, texture, weight, size)

Use the worksheet on the following page to classify the different soils. Divide the class into four groups. Each group should rotate among the four tubs and place a pinch of soil in whichever category they feel it belongs.


Light
Dark
Chunky
Fine
Smooth
Rough

Which kind of dirt do you think is best for growing plants?

Most prairie soil is very good for growing plants. It is so good, in fact, that most of it is being used to grow crops like corn, wheat, and soybeans.

Figure B2 (Corn)
Figure B3 (Rocky prairie)

Pass around the **corn, wheat, and soybeans**. Do you recognize any of them? Have you eaten any of these grains today? Remind your students that these are all examples of *seeds* that we eat regularly. Some of these are also grown especially for cattle to eat.

Only the soil that was very rocky is still used to grow native prairie grasses. Most of this is in the Flint Hills of Kansas where the prairie soils have not been tilled or plowed.

Take a pencil or your finger and drag it through the garden soil tub and then through the Flint Hills tub. Discuss how the rockiness of the Flint Hills soil is what saved it from being turned into cropland.

Lesson C: Rain

Objectives:

- Students will understand that plants need water (in the form of precipitation) to grow.
- Students will understand that measuring rainfall is important to various people.
- Students will use tools to practice measuring skills.
- Students will observe and record weather patterns.

Materials:

____ Rain gauge

Curriculum Standards:

- Earth and Space Science B2
"observes and recognizes the sun, moon, stars, clouds, birds, airplanes, and other objects in the sky"
"describes that the sun provides light and warmth"
- Earth and Space Science B3
"observes changes in the weather from day to day"
"records weather changes daily"
- Science and Technology B1
"experiences science through technology"
- Geography Standard B3 (1st and 2nd grade)
"The student understands Earth's physical systems and how physical processes shape Earth's surface."

Figure C1 (Rain)

All living things need water to survive. Most water in the prairie falls in the form of rain, but some falls as snow also.

Some kinds of grass need only a little bit of water to survive. Buffalo grass is one example that grows in the drier parts of western Kansas. It survives with just 10 inches of rain per year. Other kinds of grass, like big bluestem, need more like 30 inches of rain to survive so they grow only in the eastern parts of the state. Here at Tallgrass Prairie, we get about 35 inches of rain each year. But remember – this is an *average*. Some years it is dry, some years it is wetter. The more rain that falls, the taller the grass grows.

Math Counts!
If you want to grow big bluestem but you only receive 10 inches of rain per year, how much more rain will you need?

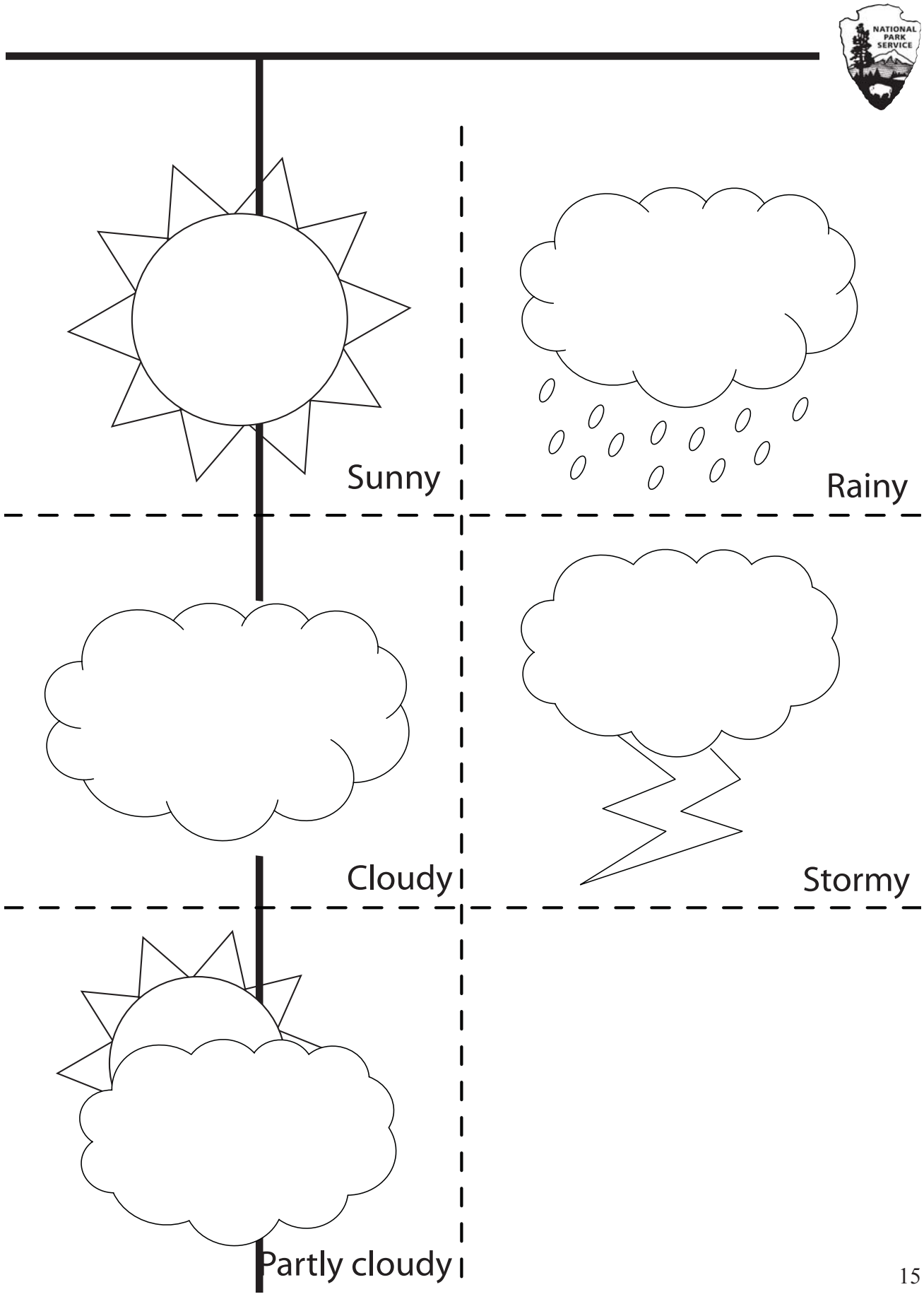
Vocabulary Counts!
Average

Many people across the country watch weather patterns. Some people, like farmers and ranchers, depend on rain to fall at certain times so that their crops and grasses will grow.

What might happen if *not enough* rain fell on a farmer's crop?
What might happen if *too much* rain fell on a farmer's crop?

Figure C2 (Drought)
Figure C3 (Flooding)

Many people simply enjoy following the weather! Follow the weather at your school by copying, coloring, and cutting out the symbols on the following page.


Sunny
Rainy
Cloudy
Stormy
Partly cloudy

Scientists help people set up weather stations across the country to help track the information. (Do you have a weather station at your school?)

Weather stations can measure things like:
- rainfall
- wind speed
- wind direction
- humidity
- air temperature

Kids across America are helping scientists keep track of the weather by building and maintaining weather stations. You can too!

Vocabulary Counts!
Precipitation

One simple way to track the weather is with a rain gauge. A rain gauge is a tool that measures how much *precipitation* falls. Rain gauges come in all shapes and sizes, but they all have a wide mouth at the top and a skinnier tube below. The skinnier the tube, the more precise the gauge.

Pass around the **rain gauge** and give everyone a chance to look and feel. Try setting it out and "raining" on it with a watering can. Read the measurements.

Interested in creating other homemade weather instruments? Check out: http://www.fi.edu/weather/todo/todo.html

You can make your own rain gauge at home or in the classroom using simple household materials. Just tape a ruler to a jar, can, or plastic bottle and attach it to something sturdy like a fence. Keep your rain gauge away from rooflines, trees, or other obstructions. Measure the amount of rain you get during one storm, over the course of a week, or over the course of a month. Keep records.

Which months do you think will be the rainiest? Which will be the least rainy?

Lesson D: Fire

Objectives:

- Students will understand that fire is a natural part of the prairie ecosystem.
- Students will understand that fire can be dangerous to humans.
- Students will understand that fire is a tool humans use to manage prairies.

Materials:

____ Patch burn felt board & pieces
____ Fire emblem
____ Cow emblems (3)

Curriculum Standards:

- Life Science B1
"discusses that organisms live only in environments in which their needs can be met
- Science in Personal and Environmental Perspectives B1
"discuss the basic human need for safety and how to practice safety at home and school"

Along with sunshine and rainfall, the prairie sees fire. Natural prairie fires are caused by lightning which strikes and sets plants on fire. The more plants there are, and the drier they are, the bigger the fire.

Figure D1 (Burning prairie)

"We stood in the dark on the platform of our Pullman, fearfully and in awe, marveling at the gruesome yet sublime spectacle: flames as far as the eye can see in every direction, nothing but flames leaping twenty feet and higher, filling the sky with black clouds, a sea of flames racing toward us and threatening to swallow us and all travelers, as the Red Sea swallowed Pharaoh's armies. But such a threat looms only when grass is very dry and exceptionally tall. Otherwise, fire is merely a long line about six feet wide, easily jumped to safety. Fire therefore seldom frightens settlers; their lives and possessions are usually safe. The most dangerous of these blazes rage in novels." -- Ernst von Hesse-Wartegg, "Across Kansas by Train" (1877) [as quoted in PrairyErth by William Least-Heat Moon]

Figure D2 (Spring prairie)

However, fires do not kill every plant. Most prairie grasses are *adapted* to lots of fires and grow very deep roots that store energy and keep the plant alive until the following spring. When a fire burns through the prairie, the ground is first black and then, a few days later, starts to turn bright green from all the new plants that have come up. New plants like these are very tasty and nutritious for grazing animals.

However, fire can be very dangerous to human beings. Because there are so many people and buildings to protect now, we can't let lightning burn wherever and whenever it pleases. But fire is good for the prairie, so we set our own fires! Ranchers and scientists have been doing this for a long time and are still learning how to do it best. Two things have to happen:

1) The grazers have to have enough good stuff to eat (that means recently burned areas)
2) The other animals have to have the kind of *habitat* they need as well (that means old unburned areas, too!)

Do you know what to do in case of fire in your school or home? Review the plan with your teacher and family.

So, Tallgrass Prairie National Preserve divides its prairie into chunks called *patches*. Not every patch is burned every year. Instead, the burned patches are rotated so that all different kinds of habitat can be represented.

Math Counts! If your pasture is 300 acres and you split it into 3 patches, how big would each patch be?

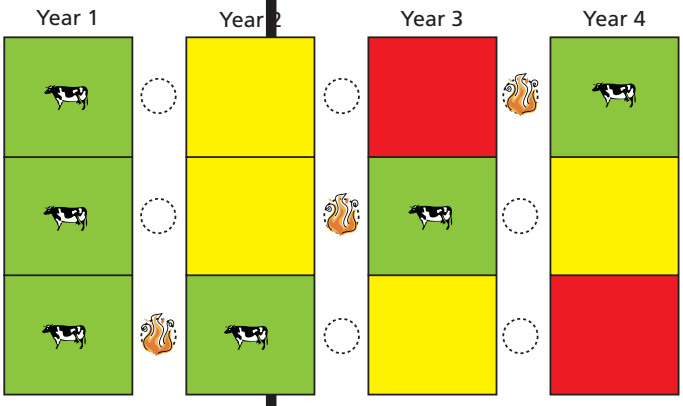
Try this puzzle. You've been given a pasture that has been recently burned. Everything is green, grazers have all of their favorite foods, but there is only one kind of habitat. Without any buildup of grasses, nesting birds have no place to hide! Your job, as ranch managers, is to split this pasture into three pieces and burn one piece each year so that there are all types of habitat available.

Take out the **patch burn felt board**. Year 1 should be all green with a cow in each patch. Stick the **fire emblem** next to the patch you decide to burn. Year 2 should reflect the changes that will have occurred. Continue until you have one of each type of habitat represented in the pasture. Where you have just burned pasture, place a **cow emblem.**

Key:
If a green patch is left unburned, it turns yellow.
If a yellow patch is left unburned, it turns red.
Burning a pasture turns it back to green.
Cattle only graze in green pastures.
A red patch should be next for burning!

No fair skipping a step!

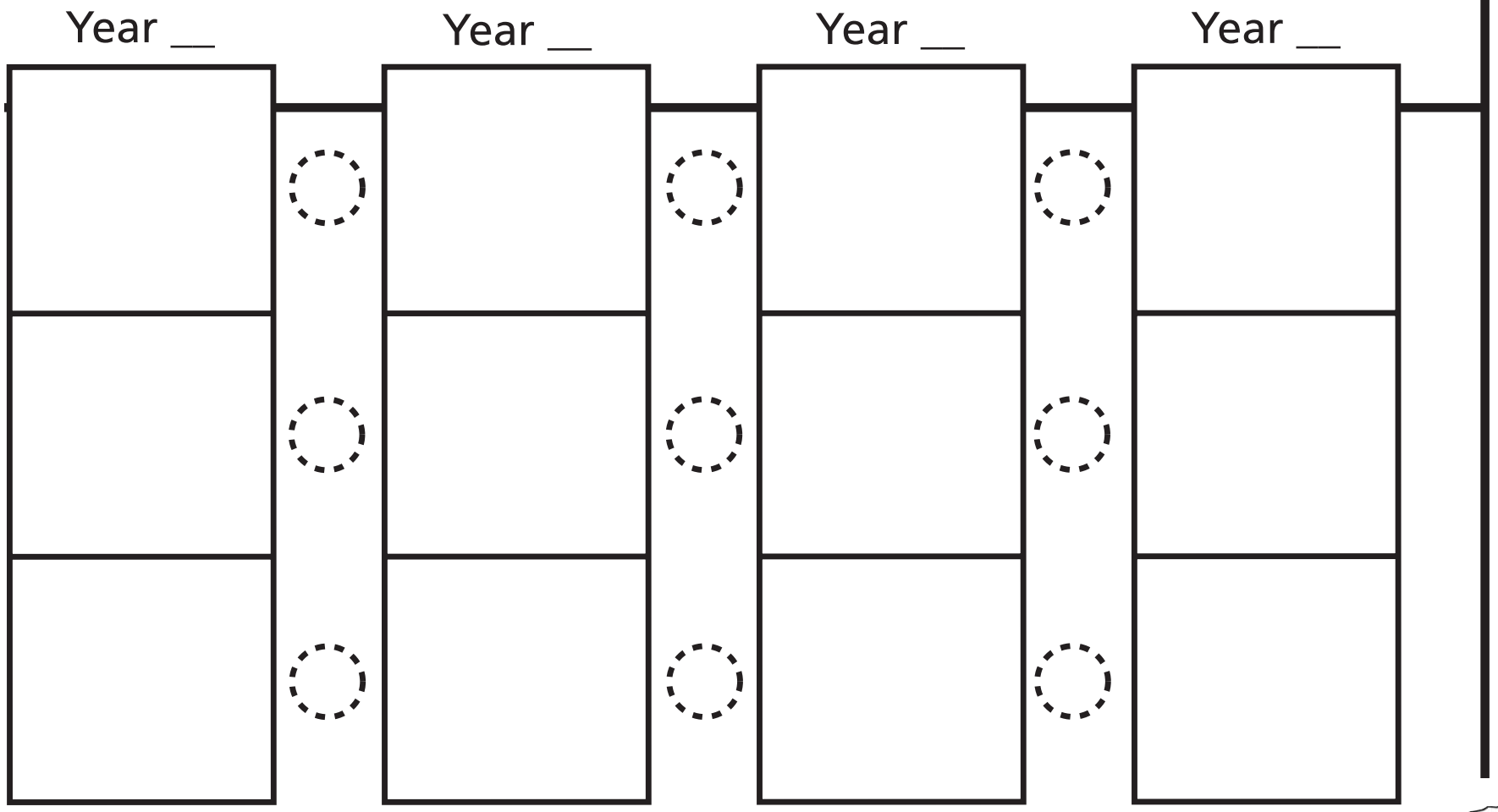
Patch Burn Grazing



The finished product could look something like this.

Try additional variations by using the felt pieces or coloring the worksheet provided on the following page.

Patch Burn Grazing



Lesson E: Grass

Objectives:

- Students will learn how tall the “tallgrass” gets.
- Students will learn how deep the roots of prairie plants grow.
- Students will learn how extra height helps prairie plants spread their wind-dispersed seeds.

Materials:

____ Tape measure
____ Big bluestem
____ Indian grass
____ Switchgrass
____ Little bluestem
____ Canada wild rye
____ Model seeds

Curriculum Standards:

- Science as Inquiry B1
“classifies and arranges groups of objects by a variety of properties, one property at a time”
- Life Science B1
“examines the structures/parts of living things”

Community Counts! How tall are you? How tall are your classmates? How tall are your family members?

The most common kind of plant to grow in a prairie is grass. These grasses are different from the kind of grass you might have in your lawn or your schoolyard, though. Prairie grasses are very special and the prairie grasses that grow at Tallgrass Prairie National Preserve are TALL! Early settlers who came across the country from the east were shocked when they saw the vast stretches of tallgrass prairies. Some grasses like big bluestem and Indian grass can grow up to 8 or 9 feet tall! Sometimes people on horseback had to standup in their stirrups to be able to see over the tops of the grasses.

Take out the **tape measure**, extend it to 8 feet and push the locking button. Set it on the floor and have the students stand next to it. How tall are you compared to a big bluestem plant?

What about the root systems? One stem of big bluestem grass has roots going down up to 10 feet into the soil!

Climb to the top of a staircase. Have students stand on the step they think is 10 feet below. Would the roots of a big bluestem plant reach all the way down to the floor? Extend the tape measure 10 feet down.

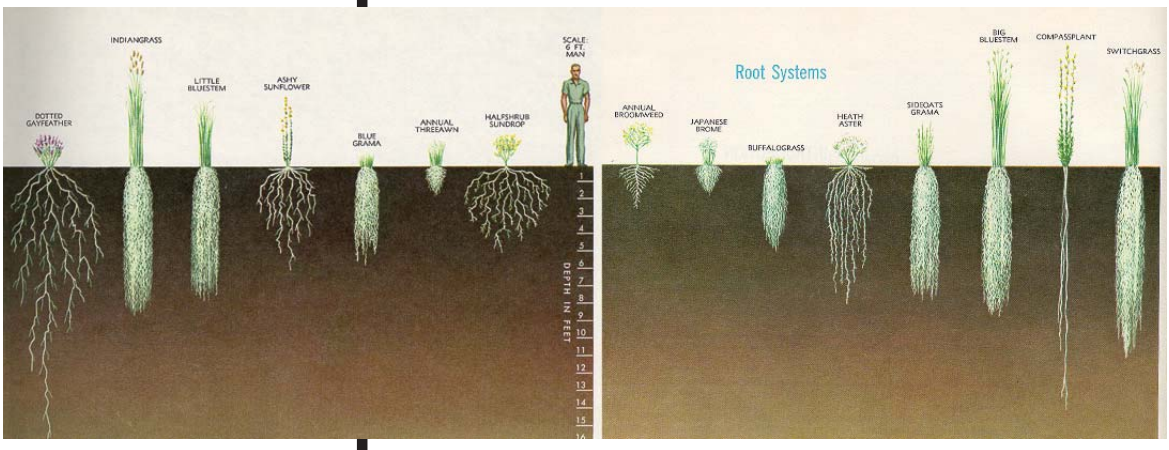


Figure E1 (Height and depth)

Those roots have to find their way through cracks in the rocks and in between the roots of all the other hundreds of plants around them. Deep roots are what keep prairie grasses alive during times of *drought*, fire, and grazing.

But why would a plant go to so much effort to be taller than the rest? After all, it takes a lot of that plant-made sugar to grow a stem so tall. To find out, let's look at what's up there at the top of the plant.

Show the **grasses in tubes**. Review the parts of the plant that you can see (the stem, the leaves) and remind the students that seeds come from flowers at the top of the plant.

How many seeds can you count on each plant? What would happen if they all dropped and tried to grow right under the parent plant? Get all of the students to bunch up together. Is it hard to move? Is it hard to breathe?

Seeds need to find their own place. Some seeds are found in very tasty fruits and are transported by animals when they eat the fruit. Some seeds are sticky and get stuck on the fur of animals walking by.

Grasses spread their seeds with wind power. They are light and can be blown long distances by those persistent Kansas winds. Is there more wind up at the top of a plant or down near the ground?

Perform a scientific experiment to answer the following question: What shape is best for a wind-dispersed seed?

Use the **model seeds** to perform the experiment. Each child can choose one "seed" from the bag. Lay the seed on the edge of a desk. On the count of three, everybody will blow on their seed.

Which seed traveled the farthest? Why do you think that is? Were there any variables in the experiment that you would want to adjust in the future?

Design and draw a picture of your own wind-dispersed seed. How will you get it to fly as far as possible? Will it have wings?

Lesson F: Wildlife

Objectives:

- Students will learn about the life cycle of the grasshopper.
- Students will explore the beginnings of the prairie food web.

Materials:

____ Preserved lubber grasshopper
____ Food chain tags (12)
____ Ball of string

Curriculum Standards:

- Life Science B1
"discusses that organisms live only in environments in which their needs can be met"
"observes life cycles of different living things"
"examines the structures/parts of living things"

Although the prairie may look empty, it is home to many different kinds of animals. Many of them are small and will hide if they see or hear you coming. In order to see wildlife, you have to be very watchful, very quiet, and know what to look for. Look for tracks, listen for sounds, use your nose!

One of the smallest, but most significant animals is the grasshopper. Actually, there are thousands of different kinds of grasshoppers in the world and over 50 different kinds that live at Tallgrass Prairie.

Pass around the **preserved lubber grasshopper**. Explain that this grasshopper was never taken from the prairie but was bred in a laboratory so that students could learn about it. Remind your students that good scientists leave animals where they find them and let them live naturally.

Figure F1 (Spring prairie)

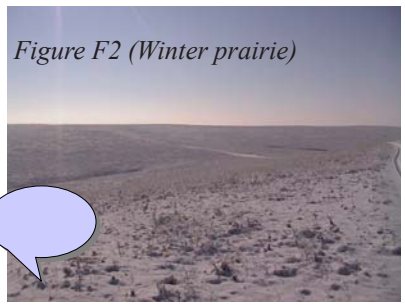


Figure F2 (Winter prairie)

Community Counts! Does anybody in your class have a birthday in May or June?

Grasshoppers begin their lives as eggs laid in late summer, spend the fall, winter, and spring asleep, and then hatch in May and June. Why do they wait so long? Look at these two pictures of the prairie – one taken in summer, and one in the winter. If you were a baby grasshopper, which would you prefer? When do you think you could find more food to eat?

Vocabulary Counts!

Incomplete metamorphosis
Egg
Nymph
Adult

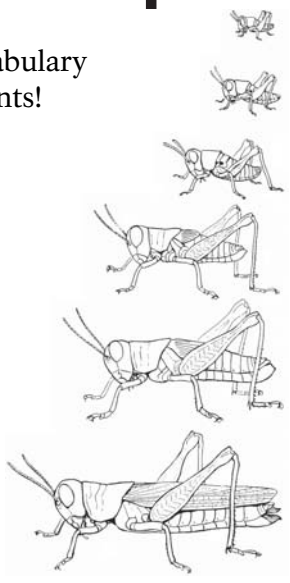


Figure F3 (Grasshopper life cycle)

Baby grasshoppers start as *eggs*. When they hatch, they are called *nymphs* and look just like miniature versions of adult grasshoppers. They shed their skin (molt) five times and then live as *full adults* for as many as 30 days. This type of change is called *incomplete metamorphosis*.

Math Counts! How much food would a grasshopper eat in 2 days? 3 days? 10 days?

Grasshoppers eat .1gram of grasses and vegetative material every day (approximately the weight of 4 grains of rice). That may not seem like a lot, but it's 1/3 of the grasshopper's entire body weight! Imagine a human eating 60 pounds of food every day! If there are a lot of grasshoppers in a certain stretch of prairie, they can actually consume more grass than cattle do.

Figure F4 (Locusts swarming)

Some kinds of grasshoppers do something called *swarming* where they become aggressive in large groups. People call these grasshoppers *locusts* and they can consume so much food that it can destroy entire crops.

Grasshoppers are food to many animals including birds, reptiles, and other insects. They are also food to humans in many cultures around the world! Grasshoppers found in the rice fields of Korea are a popular midday snack. Fried with lemon and chile, grasshoppers are called *chapulines* in Mexico.

Community Counts! Ask around. "How would you eat your grasshoppers? Dipped in chocolate?"

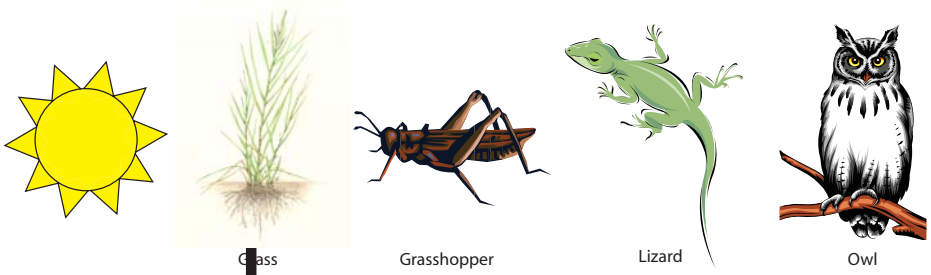
Grasshoppers are just the beginning of the story of animals in tallgrass prairie. There are also 140 different kinds of birds, 43 reptiles, 12 amphibians, and 45 mammals. Some of these animals are active here year- round, some *migrate*, and some go to sleep or *hibernate* through much of the winter. All must find what they need to survive – food, water, and shelter. Many times, they depend on each other for these needs.

Vocabulary Counts!
Food chain
Food web
Herbivore
Carnivore
Omnivore

A *food chain* describes how different animals interact with each other. It starts with the sun as a necessary ingredient for plants to make food. Animals that eat plants are called *herbivores*. Animals that eat other animals are called *carnivores*. Animals (like us!) that eat both plants and animals are called *omnivores*.

Distribute the **prairie food chain tags** to the students. Have them line themselves up in the order they think is right -- from sunlight on to the top carnivore.

There are many possible combinations. Here is one example:



Are these the only animals that you might find in the prairie? Think of some other plants and animals. Draw pictures of them and add them to the mix. Putting everything together gives you a *food web*.

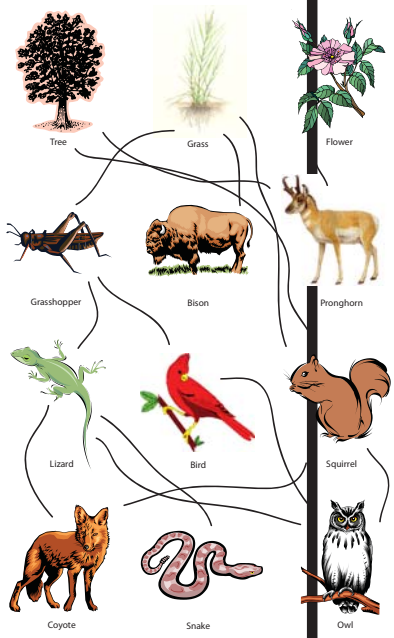


Figure F5 (Food web)

Stand in a circle to create your own living food web. Hold onto the end of the **ball of string** and toss the ball (underhand, please!) to someone else in the circle. When you toss the ball, name a plant or animal that lives in the prairie grasslands. That person holds onto the string and tosses the ball to someone else, naming another plant or animal in the food web. When everybody has ahold of a part of the web, give a slight tug and see who feels it. The web should be taut enough so that almost everybody in the circle will feel something.

Can anything in the prairie live without food, shelter, and water?
Can we?

Lesson G: People

Objectives:

- Students will understand that human beings have been living in the prairie since the prairie began.
- Students will be able to identify three distinct periods of human history in the prairie (American Indian, white settlement, modern)

Materials:

____ Arrowhead
____ Bullet
____ Shopping basket
____ Buffalo bladder
____ Canteen
____ Plastic water bottle
____ Photo of tipi
____ Photo of sodhouse
____ Photo of limestone mansion

Curriculum Standards:

- Geography Standard B5
"The student understands the effects of interactions between human and physical systems"
- History Standard B1 (Kindergarten)
"The student understands the significance of important individuals and major developments in history."
- History Standard B2 (1st and 2nd grade)
"The student understands the importance of groups of people who have contributed to the richness of our heritage"
- History Standard B4
"The student engages in historical thinking skills."

Vocabulary Counts!
Archaeologist

The prairie has never been empty of people.

These grasslands started to form not long after the last Ice Age -- over 10,000 years ago -- and *archaeologists* have found evidence of human beings on the grasslands at about that same time.

Whether they lived in ancient times, historic times, or modern times, all people have needed the same basic things from their environment -- food, water, and shelter. In this way, humans are no different from any of the other varieties of wildlife on the prairie. (Remember your food web?) However, people in different time periods used different tools and technologies to meet their needs.

Remove the **arrowhead, bullet, and shopping basket** from the trunk. These are all tools that humans have used to gather food.
Remove the **buffalo bladder, canteen, and plastic water bottle** from the trunk. These are all tools that humans have used to store water.
Remove the **photos of the tipi, sod house, and limestone house** from the trunk. These are all structures that humans have used for shelter.

Which of these items would belong with American Indians going back thousands of years (ancient time period)?
Which would belong with white settlement going back over 100 years (historical time period)?
Which belong with us today (modern time period)?

Throughout history, people have lived on the prairie and depended on its *natural resources* to survive. What kinds of natural resources do you use today that come from the prairie?

Most prairies in North America today are grazed by domestic cattle. Anyone who has ever eaten a hamburger has benefitted from the prairie's natural resources. What kinds of natural resources will we need or want in the future? Will they still be around?

Lesson H: Preserve and Protect

Objectives:

- Students will understand that tallgrass prairies were once very common and vast but are now rare and segmented.
- Students will understand that planting native plants is a good way to improve the natural environment.
- Students will be able to watch a plant grow from seed.

Materials:

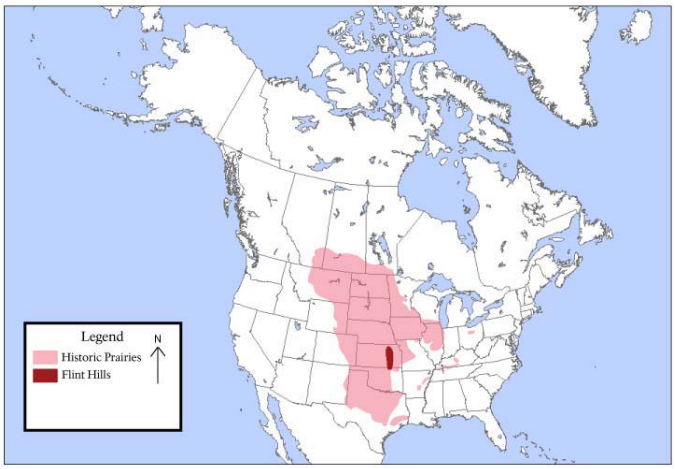
____ Packet of seeds

Curriculum Standards:

- Geography B1
"The student uses maps, graphic representations, tools, and technologies to locate, use, and present information about people, places, and environments."
- Geography B5
"The student understands the effects of interactions between human and physical systems."

Prairies once covered huge tracts of North America. Over 400,000 square miles -- an area about the size of California and Texas combined -- was covered in big bluestem grasses and was home to hundreds of species of wildlife. Those prairies had been growing there for over 10,000 years.

Figure H1 (Prairie map)



Today, scientists estimate that less than 4% of that original range still exists. Most of the original tallgrass prairies were turned into croplands, towns, and cities.

A lot of what's left lies within the Flint Hills of Kansas, a region stretching from Nebraska to Oklahoma. The rocky soils and hilly terrain of the region kept the prairies from being turned into crops.

Can you find Kansas, Nebraska and Oklahoma on the map? Can you find the Flint Hills?

Community Counts! It takes many people working together to protect something special. Is there a special place near your home or school that you would like to see protected?

Tallgrass Prairie National Preserve protects a remnant of tallgrass prairie over 10,000 acres. The preserve is run in partnership between the National Park Service, The Nature Conservancy, and the Kansas Park Trust. Everybody works together to make sure that this remnant of tallgrass prairie stays healthy for plants, animals, and humans.

Part of the job of keeping tallgrass prairies healthy is helping to grow new plants. In areas where weeds and non-native plants have taken over, scientists can go back and plant native grasses and flowers. When the prairie plants come back, the prairie animals come back too! Many people like to grow prairie plants in their yards and public areas as well. They are very beautiful, they are easy to maintain, and they attract all kinds of birds, insects, and other animals.

Take out the **packet of seeds** from the trunk and explain to the students they can be part of restoring prairie habitat. Follow the instructions on the seed packet and watch your prairie plants grow!

Post - Trunk Activities

Congratulations! You've completed the Recipe for Prairie travelling trunk! Please fill out the **Evaluation Form** enclosed in the trunk so that we can improve and expand this program.

Try a few of these follow-up activities:

There are many different kinds of landscapes in the world. You've learned a bit about what goes into making a tallgrass prairie but what about shortgrass prairies, savannahs, forests, tundras, and deserts? What do other parts of the world look like? How are they similar? How are they different?

Take a field trip to your neighborhood prairie preserve to see things close up. There are many in the Flint Hills region of Kansas including:

- Tallgrass Prairie National Preserve, Strong City
- Konza Prairie Biological Research Area, Manhattan
- Maxwell Wildlife Refuge, Canton

References and Additional Resources

For younger students (Grades K-3)

Allen, Judy and Humphries, Tudor. Are You a Grasshopper? (Backyard Books), Kingfisher: 2004.

Carle, Eric. The Tiny Seed, Picture Book Studio, Natick, MA: 1987.

Dewitt, Lynda and Croll, Carolyn. What Will the Weather Do?, HarperTrophy: 1993.

Dvorzak Jr., David. A Sea of Grass, Macmillan, New York: 1994.

Fleming, Denise. In the Tall, Tall Grass, Henry Holt and Company, New York: 1991.

Gibbons, Gail. Weather Forecasting, Aladdin: 1993.

Gibbons, Gail. From Seed to Plant, Holiday House: 1993.

Jordan, Helene and Krupinski, Loretta. How a Seed Grows, HarperTrophy: 1992.

Kalman, Bobbie. Photosynthesis: Changing Sunlight Into Food, Crabtree Publishing Company: 2005.

Lauber, Patricia and Keller, Holly. Who Eats What? Food Chains and Food Webs. HarperTrophy: 1995.

McMillan, Bruce. Counting Wildflowers; Lothrop, Lee & Shepard Books; New York: 1986.

Schmid, E. The Living Earth, North-South: 2000.

Silverstein, Alvin and Virginia. Life in a Bucket of Soil, Dover Publications: 2000.

Tomecek, Steve and Woodman, Nancy. Dirt: Jump Into Science, National Geographic Children's Books: 2002.

For older students (Grades 3-6)

Bial, Raymond. A Handful of Dirt, Walker Books for Young Readers: 2000.

Breen, Mark et al. The Kid's Book of Weather Forecasting: Build a Weather Station, 'Read the Sky' & Make Predictions, Williamson Publishing Company: 2000.

Ditchfield, Christin. Soil (True Books), Children's Press: 2003.

Kalman, Bobbie and Langille, Jacqueline. What Is a Life Cycle?, Crabtree Publishing Company: 1998.

Kalman, Bobbie and Langille, Jacqueline. What Are Food Chains and Webs? Crabtree Publishing Company: 1998.

Lerner, Carol. Seasons of the Tallgrass Prairie, William Morrow and Company, New York: 1980.

Murray, Peter. Prairies: Biomes of Nature, The Child's World Inc., 1997.

Patent, Dorothy Hinshaw. Fire: Friend or Foe, Clarion Books,

Patent, Dorothy Hinshaw. Prairies, Holiday House, New York: 1996.

Petersen, Christine. Conservation (True Books), Children's press: 2004.

Inventory

Please take the time to check all of the items in the trunk before and after use. If anything is missing or damaged, please contact us immediately.

Tallgrass Prairie
National Preserve
Route 1 Box 14, Hwy 177
Strong City, KS 66869
(620) 273-8494
tapr_interpretation@nps.gov

____ Activity booklet
____ Photo CD
____ Transparencies
- ____ Figure A1 (Big Plantdigram)
- ____ Figure B1 (Dirt)
- ____ Figure B2 (Corn)
- ____ Figure B3 (Rocky prairie)
- ____ Figure C1 (Rain)
- ____ Figure C2 (Drought)
- ____ Figure C3 (Flooding)
- ____ Figure D1(Burning prairie)
- ____ Figure D2 (Spring prairie)
- ____ Figure E1 (Height and depth)
- ____ Figure F1 (Spring prairie)
- ____ Figure F2 (Winter prairie)
- ____ Figure F3 (Grasshopper life cycle)
- ____ Figure F4 (Locusts swarming)
- ____ Figure F5 (Food web)
- ____ Figure H1 (Prairie map)

_____ Evaluation Form

Lesson A: Sunlight
____ Singing In Our Garden CD
____ *Food* tubs (2)
____ *Water* tubs (2)
____ *Air* tub
____ *Sun* tub
____ Bucket
____ Plastic cups (10)
____ Measuring spoons(3)
____ Sponges (5)
____ Blue food coloring
____ Yellow food coloring
____ Big leaf
____ Flower shoebox
____ Fishing poles (5)
____ Bees with pollen (10)
____ 20-foot rope
____ Root network

Lesson B: Dirt
____ Garden soil
____ Sand
____ Clay
____ Flint Hills topsoil
____ Blindfolds (4)
____ Corn
____ Wheat
____ Soybeans

Lesson C: Rain
____ Rain gauge

Lesson D: Fire
____ Patch burn felt board & pieces
____ Fire emblem
____ Cow emblems (3)

Lesson E: Grass
____ Tape measure
____ Big bluestem
____ Indian grass
____ Switchgrass
____ Little bluestem
____ Canada wild rye
____ Model seeds

Lesson F: Wildlife
____ Preserved lubber grasshopper
____ Food chain tags (12)
____ Ball of string

Lesson G: People
____ Arrowhead
____ Bullet
____ Shopping basket
____ Buffalo bladder
____ Canteen
____ Plastic water bottle
____ Photos of shelters (tipi, sodhouse, limestone mansion)

Lesson H:
____ Packet of seeds