
Rain Shadow Play

Activity Overview:

Students demonstrate, as a living model, why prairies are in North America.

Objectives:

- Use a model to explain an event in the natural world
- Explain how physical changes on the earth contribute to changes in populations of plants and animals

Subjects Covered: Science, Language Arts, Theater, Social Studies

Grades: 3 through 8

Activity Time 45 minutes

Season Any

Materials: Optional Props—signs to identify characters

State Standards

Language Arts: Orally communicate (C.4.1, 8.1, 12.1)

Listen & comprehend oral communications (C.4.2, 8.2, 12.2),

Science:

Describe weather & seasonal changes (E.4.5),

Explain & predict changes in earth's systems (E.8.1)

Describe changes on the earth's surface (E.8.3),

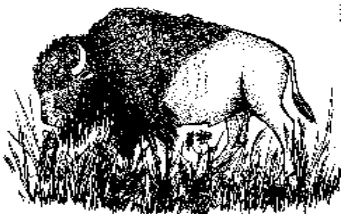
Analyze earth's geologic & life history (E.8.5),

Find connections among living and non-living things (F.4.4)

Explain survival and population growth of species (F.8.9)

Social Studies:

Map physical, natural, or human features (A.4.2)



Background

This play actively demonstrates why we have prairies in North America. Trees covered most of North America before the Rocky Mountains figuratively pierced the sky thirty million years ago. This colossal geologic event vastly changed the weather patterns east of the Rockies. As a result, a triangle-shaped area called the “Rain Shadow” stretches into the Midwest. Due to the limited rainfall within this mammoth shadow, populations of plants and animals evolved into what we now call prairie.

The cast of characters include:

Pacific Ocean	Rocky Mountains
Short Grass Prairie	Mid-grass Prairie
Tall Grass Prairie	Canadian Air Mass
Clouds	Gulf Coast “Westerlies”
Trees (in tall grass prairie and in optional first act.)	
Narrator	

Begin by assigning parts and lining everyone up in rows from west to east as if you are creating a map of North America. You'll need 5 basic rows, plus air masses to the north and south and then the clouds. Involve all students/participants in the play; numbers of each character can be increased or decreased depending on the size of group. When assigning parts, you can provide some basic information about their roles, as follows. Make the descriptions FUN AND INTERACTIVE.

Descriptions of each role:

PACIFIC OCEAN- Water evaporates from the surface of the Pacific Ocean. The water vapor rises, tiny water droplets form, which we see as clouds. The ocean players move like the waves in the sea. *Students will “do the wave.”*

ROCKY MOUNTAINS - The Rocky Mountains rise up during the play. The land was flat before the mountains ascended into the sky. When the mountains rise, they block the clouds until the clouds begin to rain. *Students are sitting as the play begins; they will rise on cue.*

SHORT GRASS PRAIRIE - The short grass prairie is the first prairie east of the mountains. This prairie receives the least amount of rain. Buffalo grass is a good example of a short prairie plant growing here. As an adaptation to conserve water these plants are short in stature and have long, deep growing roots. *The short grass prairie characters crouch down, put their hands on their heads and wiggle their fingers. Their hands are the leaves and their bodies are the roots.* Buffalo grass is eaten by herds of buffalo. The buffalo (more accurately, bison) graze on this favorite food then move on. In this way, grass is able to recover before it is grazed again. Domestic cows continue grazing in the same area, not allowing the grass to re-grow. Also, in short grass prairies you will find prairie dogs. They are truly social animals, with millions living in one town. Their towns once stretched for miles and miles! *Students could pop*

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in and out of prairie dog burrows for a few moments.

MID-GRASS PRAIRIE - This is taller than the short grass prairie because it receives more rain. *Students should be on their knees.* This prairie includes a mix of short and tall prairie species. Sharp-tailed grouse live here. The males dance each spring to attract the females. They spread their wings, stomp their feet, and shake their tails back and forth so fast that their tail feathers sound like snapping fingers. When an interested female approaches, the male becomes “cool, calm, and collected,” and often bows in introduction. *Students could act out the whole dance, or just snap their fingers.*

TALL GRASS PRAIRIE - The tall grass prairie receives the most amount of rain in the prairie region. Grasses grow nine to ten feet tall in deep, rich prairie soil. Along the eastern edge of the tall grass prairie, enough moisture is available for trees to grow, too. Wisconsin, Minnesota, Illinois, Indiana and Michigan include a border between forest and prairie. In this zone there is a battle between the grasses and trees for space. Before European settlement the trees were limited by fire. After settlement, settlers put a stop to the fires. Today, trees and woodlands are more common in the eastern edge of the prairie region. *Students stand tall as grasses and trees. The grass characters imitate big bluestem grass by raising their arms above their heads and holding three fingers up in each hand.*

TREES- *Trees spread their arms (limbs) out wide because they are “open grown.”*

CANADIAN AIR MASS - *Students will blow and/or move in from the north.* The Canadian air mass and the Gulf Coast “Westerlies” are sources of moisture for the mid-grass and tall grass prairies.

GULF COAST “WESTERLIES” - *Students will blow and/or move in from the south.*

CLOUDS - *The clouds begin in the Pacific Ocean and move east. This is the most active part!*

Activity Description

The play:

First Act: The land before the Rockies. (*Optional*)

(*All characters except PACIFIC OCEAN, CLOUDS, CANADIAN AIR MASS, and THE GULF COAST “WESTERLIES” act as TREES.*)

Introduction:

Our story begins at the PACIFIC OCEAN where CLOUDS pick up moisture over the ocean. The CLOUDS become heavy with moisture and wind blows the CLOUDS over the land. Rain falls freely; large TREES soak up the ample supply of water. The CLOUDS begin to empty. Supplemental moisture blows in from the CANADIAN AIR MASS and the GULF COAST “WESTERLIES”. The CLOUDS are re-charged and rain continues to fall freely on the land.

Second Act: (*All characters take their assigned places.*)

Thirty million years ago an extraordinary geologic event took place that changed the face of North America forever. This is what happened. Again, our story begins at the PACIFIC OCEAN where CLOUDS pick up moisture over the ocean. (*CLOUDS pantomime carrying buckets of water.*) The ROCKY MOUNTAINS begin to rise and stop the CLOUDS from blowing east. The CLOUDS are holding so much water, they are too heavy to make it over the tops of the mountains. They begin to drop their water (which is why it is very rainy in Seattle). As

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the CLOUDS lighten their load, they are able to float up and over the mountains. (*CLOUDS move past the line of mountains.*) Once they cross this mountain chain of 14,000 foot peaks, the CLOUDS have very little rain available for the SHORT GRASS PRAIRIE. (*The clouds “wave” to the buffalo grasses as they blow east.*) The CLOUDS are so light now they almost disappear!

But not to worry, moisture is now picked up from the Gulf Coast and Northern Canada, from the GULF COAST “WESTERLIES” and CANADIAN AIR MASS. (*Blow, winds, blow!*) Therefore, the MID-GRASS PRAIRIES and the little rough-tailed grouse receive some rain. The CLOUDS finally reach the TALL GRASS PRAIRIE. Enough moisture is available for the tall grasses and the encroaching, thirsty TREES. At this border there is a battle between prairie and trees. (*If desired, as a surprise, the narrator could sweep through the prairie as fire and the trees fall down.*)

Conclusion:

Go through the script a second time. Make it clear to the students that they have been acting out how the mountains changed the weather patterns and created a rain shadow. Due to this climatic change a prairie biome replaced the woodlands. Prairie plants and animals evolved to survive the drought-like conditions. For more information about prairie plant adaptations, see Earth Partnership for Schools activity, “Prairie Scavenger Hunt: Studying Plant Adaptations.”

Extensions

- Students act out the Rain Shadow Play as part of a prairie planting celebration or community outreach.
- Create a diorama of the rain shadow.
- Research the diversity of plants and animals unique to each grassland type.
- Learn how specific plants and animals adapted to drought, wind and sun.

Additional Resources

- Hirschi, Ron. (1994). *Save our prairies and grasslands*. Delacorte Press.
- Earth Partnership for Schools. (1996). *A prairie journey*. UW-Madison Arboretum. Madison, WI.

Assessments

- Explain how the Rocky Mountains affected the weather patterns.
- Describe what the vegetation was like before the rise of the Rocky Mountains and then explain what the vegetation was like after the mountains arose.
- After listening to a rain shadow presentation summarize the key points and retell the events in proper sequence.