

What a Prairie Is and Isn't!

Overview

A game played by five students (four players and a judge) teaches important characteristics of a prairie ecosystem. The game incorporates a series of true or false questions that allow students to advance their positions on a game board. Students have options to improve their positions based on their knowledge of prairies.



Title

What a Prairie Is and Isn't!

Investigative Question

What are some of the characteristics that make a habitat a prairie, how did prairies form, and how does a prairie differ from a disturbed grassland or old field?

Overview

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Objective

Students play a game in which they answer true-or-false questions regarding a prairie ecosystem. They learn the characteristics of a prairie and contrast these with habitats that are not prairies (old fields, disturbed grasslands, lawns).

Materials

per group of five students: one game board (pattern found at the end of this activity); copy of Student Pages (a list of true and false questions with answers); one die; four game tokens (buttons, coins or cardboard discs in four colors or shapes).

Time

two, 50-minute class periods if all questions are used in discussion and if the writing assignment is a take-home activity

Advance Preparation

1. Make a copy of the Student Pages for every five students. If you prefer, you may provide your own list of questions. Your list may also be used in subsequent games.
2. To make a game board, reproduce the four pattern pieces and tape them together. The final board measures 17 x 22 inches. For a sturdier board, mount the pieces on cardboard.
3. Students should have been introduced to prairies through assigned readings from background materials on prairies.

Procedure*Rules of the Game*

1. Each group of five students (four players and a judge) requires a game board. The judge holds a copy of the Student Pages and determines whether the answers given by the players are correct. The judge may also share the related information that is provided with the answers.
2. Each player chooses a token and places it on "Start."
3. Each player in turn rolls the die. The player with the lowest number begins the game by rolling the die again and moving his or her token forward the appropriate number of spaces.
4. If the token lands on an unshaded square, the turn passes to the player on the left. If the token lands on a shaded square, the player is asked by the judge to answer a true-or-false question about Illinois prairies. If the answer is correct, the token remains on the square. If the answer is incorrect, the token is returned to the square on which it was resting before the die was rolled. If the player answers the question correctly and can also state why the answer is true or false (to the satisfaction of the judge), he

or she rolls the die again and advances the token. If a student attempts to explain an answer, but the judge deems the answer unsatisfactory, the token is moved back two spaces. Play then proceeds to the next player.

5. Play continues until one player has successfully completed the transit of the game board.

6. After all groups have completed the game, read each true-or-false statement (or as many as you choose) and have the class decide whether the statement contains a fact about or characteristic of a prairie or a fact about or characteristic of another type of ecosystem (old field, pasture, lawn).

7. Convert the true or false statement into a few words and write it on the chalkboard in one or both of two columns, one labeled "Prairies" and the other labeled "Old Fields, Pastures, Other Disturbed Grasslands." For example, "Prairies are landscapes dominated by grasses." The answer is "true." The abbreviated statement on the board might be, "Prairies are mostly grasses." Although this statement is true, it can also be true for disturbed grasslands. What distinguished the two habitats is that prairies are dominated by native species of warm-season bunch grasses. Pastures contain mostly cool-season, carpet-forming species. By treating as many of the questions as possible in this way, the picture of a prairie begins to emerge, and the facts students were exposed to in the game are reinforced.

8. After discussing in this fashion as many of the statements as possible, you and the class should have a fairly respectable list of characteristics of a prairie and characteristics of other habitats that, while often mistaken for prairies, are not.

Assessing the Activity

Students use the factual information they have gathered from playing the game and from the classroom discussion to write a 500-word essay on the topic, "What Is a Prairie?."

Extending the Activity

Students search a variety of resources for pictures of prairies and other grassland habitats or visit nearby grassland habitats and take photographs of those habitats. Assemble the image collection on a bulletin board with sections labeled "Prairie" and "Not a Prairie." This activity reinforces the image of a native prairie and emphasizes differences between prairies and other grasslands now found in Illinois.

Concept

A prairie is an ecosystem dominated by tall, warm-season, bunch grasses. Most prairies have disappeared because of their ability to produce soils of high quality--some of the best agricultural land on earth.

Safety and Waste Disposal

No dangerous or hazardous materials are used.

Student Pages

1. True or False: The tallgrass prairie is a recently formed (within the last 12,000 years) ecosystem.
True - Prairies formed after the last glaciation during a warm period called the Hypsithermal Interval when average temperatures were several degrees warmer than at present.
2. True or False: The tallgrass prairie has most of its plant material (biomass) in the form of grasses.
True - As much as 80 percent of prairie biomass consists of grasses. However, only 20 percent of the plant species are grasses.
3. True or False: The typical front lawn is an example of a prairie and is made up of native grasses.
False - Most lawns are nonnative (from other parts of the world), cool-season grasses, such as Kentucky blue grass. They form carpets and do not grow as tall as most native prairie grasses.
4. True or False: Sixty percent of Illinois was once covered with tallgrass prairie.
True - Early survey records (1820-1830) tell us what Illinois was like before European settlement as do the types of soil that we know develop only under prairie vegetation. Most of the prairie acreage was concentrated in central and northern Illinois.
5. True or False: Sixty percent of the plant material (biomass) in a tallgrass prairie is found below the surface of the soil.
True - Although the prairie is a perennial ecosystem, all or most of the above-ground material dies back each fall and winter and leaves only the below-ground roots, rhizomes, corms, etc. alive. These structures produce the next year's growth. Prairies grow a new crop of above-ground vegetation each year.
6. True or False: If you allow corn and soybean fields to remain fallow (unplanted) for a year or two, tallgrass prairie grows in their place.
False - So little prairie remains in Illinois that no seed source large enough exists to allow abandoned farm fields to be recolonized by prairie vegetation. Seeds that do germinate are mostly nonnative weeds with a few early successional native plants like goldenrods mixed in.
7. True or False: Prairies developed after the last continental glaciers receded from the Midwest.
True - It took some time for prairies to develop because immediately after the glaciers left Illinois, the landscape was like a subarctic landscape. As the land warmed and dried, a spruce-fir forest developed, followed by a mixed-deciduous forest. As the climate continued to warm, the vegetation shifted from oak-hickory forest to a grassland-prairie ecosystem. This change was caused by a combination of such factors as climate, grazing by large herbivores and fire. These factors tipped the balance in favor of prairie vegetation over trees.
8. True or False: Examples of tallgrass prairie are easy to find in Illinois today.
False - The prairie is one of the rarest ecosystems in Illinois, because the soils of prairies are so rich that nearly all of them have been converted to agriculture. Today only about .01 percent of the tallgrass prairie is left.
9. True or False: The prairie dog was an important component of Illinois prairies.
False - Prairie dogs live in shortgrass prairies found in the drier climate further west in the United States. They were not a part of the tallgrass prairie ecosystem in Illinois.

10. True or False: The first European explorers and settlers in Illinois had seen and experienced prairies before.

False – The first Europeans in Illinois were mostly forest-dwelling peoples and had no experience with grasslands. In fact, their languages had no word for prairie. Eventually, a French word “prataria,” meaning meadow, was adopted for this vast landscape. This word evolved into “prairie.”

11. True or False: About 2,000 years B .P. the Illinois climate was similar to the climate of today, but periodic fires helped to maintain the prairie landscape.

True - After the Hypsithermal Interval, the climate of Illinois was as suited for trees as it was for grasses. Fires that periodically burned across the land helped to keep the balance in favor of prairies. Most trees, except certain species of oaks and hickories, do not tolerate fire and are killed.

12. True or False: Prairie grasses grow in clumps or bunches.

True - The grasses of the tallgrass prairie are bunch grasses and form hummocks or tufts of grasses between which grow other plants of the prairie, the forbs or broadleaf plants. In contrast, our yards and lawns are made up of carpet-forming grasses.

13. True or False: Most of the plants that make up the prairie ecosystem came from other habitats.

True - Very few plants in a tallgrass prairie actually evolved in a grassland setting. Most came from other habitats such as sunny openings in the woods, areas along rivers and streams or even from deserts. When this vast area was "opened up" to them by climate and other factors, they simply took advantage of this new ecosystem and developed the unique habitat we call prairie.

14. True or False: The roots of prairie plants are very shallow.

False - Prairie roots are very deep, with as much as 60 percent of their biomass occurring below ground. Deep roots allow a prairie plant to survive the rigors of climate [e.g., drought], fire and grazing and make them better suited than trees for this type of habitat.

15. True or False: In today's world, prairies do not need fire.

False - Although today's prairies exist only as relatively tiny fragments, they continue to need periodic fire to maintain themselves as prairie. Fire helps in several ways, for example, it eliminates colonizing tree seedlings, removes dead plant material and releases nutrients.

16. True or False: Prairies die each fall and replace themselves only from seeds that fell the previous year.

False - Prairies have living parts below ground that are perennial: roots; corms; rhizomes; tubers; and other structures. These parts are insulated from temperature extremes and fire, and they produce the next year's vegetation.

17. True or False: Prairie grasses grow best when the weather is warm or hot.

True - Unlike the grasses in your lawn that are mostly cool-season growers (spring and fall), prairie grasses are warm-season growers and produce most of their growth during the hot months of summer.

18. True or False: Three factors that allowed prairies to form were: a hotter and drier climate than the climate at present; massive, periodic fires; and herds of large grazing animals.

True - Prairies formed mostly during a warmer and drier period, the Hypsithermal. Those conditions also promoted fires set by lightning and by Native Americans who had colonized Illinois by then. Large grazing

animals, such as bison, elk and deer, also contributed to the formation of prairie because prairie plants can be grazed without much harm.

19. True or False: The large, rounded granite boulders found on the prairie came from the bedrock below the prairie soil.

False - These boulders didn't come from Illinois at all but were brought by the glaciers. Most came from Canada. As a glacier moves, it picks up all manner of debris, including large boulders, and drops them when the ice melts.

20. True or False: Fires favor grasses over trees.

True - The above-ground parts of grasses are dead during late fall and winter when the fires occur. Below ground, and insulated from fire, the living parts of the grasses are safe. Trees, unless they have thick, corky bark, will probably be killed or severely damaged. Oaks and hickories often survived prairie fires because of their bark. The habitat thus formed was a mixture of prairie and forest called a savanna.

21. True or False: Tallgrass prairie forbs are found nowhere else but on the prairie.

False - Prairie plants did not evolve in a prairie ecosystem but colonized from other habitats such as open woodlands, floodplains and barrens.

22. True or False: The bison consumed more prairie vegetation than any other group of animals.

False - Bison were important herbivores and helped with prairie formation, but grasshoppers--literally billions of them-- were far more important in relation to total amount of plant biomass consumed.

23. True or False: There were (are) many different types of prairie in Illinois.

True - Illinois has sand prairies, wet prairies, black-soil prairies, gray prairies, gravel-terrace prairies, dolomite prairies and hill prairies. Each prairie type is dependent upon a unique set of conditions. Each shares species with the others but also has species that are adapted for the very different conditions found in each prairie type.

24. True or False: The rich Illinois soil formed very quickly under prairies, in about 2,000 years.

True - Prairie soils were formed from glacial debris and wind-blown, glacial pulverized rocks, a flour-like material called loess. Prairie vegetation contributed organic matter in the form of plant material that died and decayed above ground, but the greater contribution was from generation upon generation of deeply rooted prairie plants dying and decaying, regenerating and enriching the prairie soils.

25. True or False: Kentucky blue grass, smooth brome and tall fescue are examples of native prairie grasses.

False - These plants are nonnative species, or exotics, that come from other parts of the world.

26. True or False: The prairies were easily plowed by early European settlers using a team of oxen and a wooden plow.

False - Plowing the prairies with a massive, wooden plow was an extraordinarily difficult task. It was said that a strong man with a strong team of six oxen could plow about one to three acres in a sunup to sundown day.

27. True or False: Prairie soils were not very good because few trees grew on them.

False - Prairie soils were some of the best in the world. The reason trees did not grow on them was due to other factors such as climate and periodic fires. Where the land was protected from fire in some fashion, like a wet spot or along a river, trees grew just fine.

28. True or False: Big bluestem, Indian grass and switch grass are examples of native prairie grasses.

True - These grasses originally occurred in North America before the development of prairies, existing in open oak woodlands and other habitats. They colonized the prairie ecosystem after the glaciers receded.

29. True or False: A clump of prairie grass eight feet tall can have roots that penetrate the soil to a depth of 10-12 feet.

True - Prairie grasses are extremely deep-rooted. More than 60 percent of the plant's biomass is underground. This root system helps the plant to weather droughts because the roots reach the water table and extract nutrients from the soil for the massive above-ground growth that prairies experience each year.

30. True or False: Forbs are broadleaved flowering plants that are usually pollinated by insects.

True - Although most of the biomass (80 percent) in a prairie is composed of grasses, most of the species (80 percent) are forbs. Most of the showy, familiar prairie plants, especially the sunflowers, are forbs. Their flowers help to attract the insect pollinators necessary for plant reproduction. Grasses, however, have relatively nondescript flowers and are pollinated by the wind.

31. True or False: Not many species of plants and animals lived in Illinois prairies.

False - As many as 500 species of plants are known to occur in prairies, and an untold number of animals inhabit the tallgrass prairie ecosystem.

32. True or False: The tallgrass prairie is a perennial ecosystem. Although the visible parts of plants die back during fall, each year those plants grow anew from roots and other below-ground plant parts.

True - In the fall, the above-ground parts of prairie plants turn brown and die. Before Europeans settled Illinois, that plant material was often burned by fire. Today, it may accumulate on the ground. In spring, new growth appears either coming up through the dead vegetation or emerging from the blackened soil surface of prairies that have been burned as part of a management plan.

33. True or False: Grasses are wind-pollinated plants and do not need showy flowers to attract insect pollinators.

True - Prairie grasses usually flower in mid- to late-summer. The pollen is distributed among plants by the ever-present winds.

34. True or False: As the season progresses, prairie grasses grow tall. The forbs must also grow tall if they are to compete for sunlight and attract pollinators.

True - During the growing season, most early spring forbs, such as phlox and shooting star, are relatively short because the grasses have just begun to grow. As the season progresses, the forbs get taller and coarser to stand up against the wind and to compete with the grasses for sunlight for photosynthesis.

35. True or False: Illinois was part of the shortgrass prairie ecosystem.

False - Illinois was partially covered by what is called the prairie peninsula of tallgrass prairie. Shortgrass prairies occurred further west. A good rule of thumb to use is that the farther one progresses east from the Rocky Mountains the wetter the climate becomes and the taller the prairie grasses grow.

36. True or False: Prairie fires killed most of the prairie vegetation.

False – Fire releases prairie growth. It removes the dead above-ground vegetation that shades the soil surface, thereby allowing the surface to warm more rapidly in spring. Fire also releases nutrients that are tied up in dead plant material and makes them available for use by the still-living, below-ground prairie plant parts. These plants survive because soil is a good insulator and protects them from the heat of fire.

37. True or False: Rows of Osage orange trees are remnants of old forests. Early settlers left these single rows of trees for windbreaks.

False - Osage orange was native to Arkansas, Oklahoma and Texas. Early settlers planted Osage orange hedge rows as windbreaks, but they do not occur naturally on the prairie.

38. True or False: The word *prairie* comes from the Native Americans and means "land where the buffalo roam free."

False – "Prairie" is from a French word meaning "meadow."

39. True or False: Chickens that were brought with the European settlers and escaped to the wild became known as prairie-chickens.

False – Greater prairie-chickens are a native bird related to the grouse. They existed in large numbers and formed a staple in the diet of Native Americans and early settlers. Few exist in Illinois today due to loss of habitat and other factors.

40. True or False: Most of the Illinois tallgrass prairie was a very dry ecosystem.

False - The glaciers left much of central and northern Illinois very wet, and this landscape came to be colonized by prairie vegetation. During some seasons of the year the prairie was nearly impossible to cross with a horse and wagon because the wagon became mired in muck. These same prairies are now corn and soybean fields. They are much drier today because of extensive tiling that drains off moisture each spring, mostly into drainage ditches that were formerly streams that have now been straightened and deepened.

41. True or False: Ring-necked pheasants were an important native prairie bird.

False - The pheasant is a Chinese bird that was introduced into North America during the middle of the nineteenth century. It successfully out-competes native prairie-chickens when the two species occupy the same habitat.

42. True or False: Prairie potholes were formed where dirt was taken by early settlers for sod houses.

False - Prairie potholes were shallow depressions scraped out and left by glaciers. They usually held water during the wettest parts of the year. Sod houses were little used in Illinois.

43. True or False: Soybean was a native prairie plant that has become domesticated.

False - Soybean is an imported plant from China. It was brought to Illinois about the same time as the ring-necked pheasant.

44. True or False: The ponds along interstate highways are examples of prairie potholes.

False - These ponds are called borrow pits. They were created when soil was removed to build the raised roadbeds and interstate overpasses.

45. True or False: Queen Anne's lace is an indicator of a high quality prairie.
False - Queen Anne's lace, or wild carrot, was introduced from Europe and is a common prairie invader. It is often sold in prairie seed mixes of poor quality.

46. True or False: Oxeye daisy is a native of drier (xeric) prairie areas of Illinois.
False - Oxeye daisy was introduced into North America by European settlers.

47. True or False: Spiderwort is a spring-flowering native prairie plant.
True - It grows on drier sites in prairies and woodlands and does very well in sand prairies.

48. True or False: Jerusalem artichoke was introduced from the Middle East and became the scourge of the prairie.
False - Jerusalem artichoke is a native prairie sunflower. Its starchy tubers were an important food for Native Americans and early settlers. It is still eaten today.

49. True or False: Bison never occurred east of the Mississippi River.
False - Bison once ranged as far east as New Jersey.

50. True or False: Rattlesnake master was important to Native Americans and early settlers as a tonic to tame aggressive reptiles.
False - Rattlesnake master was once thought to be useful in treating snake bites, but its efficacy has proved unfounded.

51. True or False: Due to their delicate root structures, no native prairie plants have been adapted for use in the garden.
False - Most prairie plants have deep and extensive roots, and many popular garden plants are or were developed from native prairie plants. These include butterfly-weed or butterfly flower, coreopsis, coneflower, sunflower, phlox, spiderwort, black-eyed Susan and blazing-star.

52. True or False: Illinois is known as the prairie state because it contains more than 90 percent of its original prairie vegetation.
False - Illinois is called the prairie state because it once contained 21.4 million acres of prairie. Only about 2,500 acres, less than 0.01 percent, of the original prairie remain in Illinois.

53. True or False: Fire helps maintain a prairie because it kills many of the woody invaders. Many of the prairie plants, however, have deep root systems and are not killed by fire.
True - Besides killing woody plants and keeping the prairie from growing into forest, fire also kills many invasive foreign plants. Fire was used by Native Americans to maintain prairie. Controlled burning remains an important tool today in the maintenance of prairie remnants.

54. True or False: There are no woody plants native to the prairie.
False - Several plant species that occupied prairies are considered woody. Hazelnut, New Jersey tea and leadplant are a few of those species.

55. True or False: Any field dominated by grasses is a prairie.
False - Most landscapes that have been stripped of their native vegetation and left to revegetate on their own become old fields dominated by exotic grasses and weeds. A prairie habitat must have a variety of native, warm-season grasses and many species of forbs.

56. True or False: Most prairie flowers bloom in the spring before they are shaded by the grasses.
False - Prairie flowers bloom throughout the season. As the grasses grow taller, most of the forbs also grow taller to compete for sunlight and to make themselves conspicuous to pollinators.
57. True or False: Prairies grow only on very flat ground and that is why they dominated much of Illinois.
False - Although flatness does allow prairie fires to sweep across the landscape, prairie also is found on steep bluff tops. These are called hill prairies or goat prairies.
58. True or False: The honey bee is an important native pollinator of prairie plants.
False - The honey bee is an important pollinator, but it is not native and was brought to the New World very early by colonists from Europe.
59. True or False: Some prairie plants are pollinated by only one small group or a single species of insect.
True - Plants and insects that evolved together in a relatively stable ecosystem over a long period time often develop unique, intricate relationships that facilitate reproduction by the plant and provide a discrete food source for the insect. Some prairie orchids are examples of species that have only a few pollinators.
60. True or False: Native Americans were able to obtain much of their food from prairie plants.
True - Native Americans used the above-ground parts of prairie plants for food, but they also obtained food from the roots, tubers, rhizomes and corms that occurred below ground. Examples include Jerusalem artichoke roots and wild hyacinth bulbs.
61. True or False: Native Americans obtained much of their medicines from prairie plants.
True - Plants such as purple coneflower and snakeroot provided tonics. Wild quinine was used as a cure for fevers.
62. True or False: The gray wolf was an important predator on the prairie, feeding on bison, elk and deer.
True – However, the species was extirpated from Illinois very early in its colonization by Europeans, around the end of the 1800s.
63. True or False: The coyote, or prairie wolf, was extirpated from Illinois in the early 1900s.
False - The coyote remains common in Illinois and has adapted very well to the current landscape.
64. True or False: Prairies were easy to travel across because they were flat and covered with grasses.
False - The prairie vegetation was tall, thick and often formed hummocks or mounds that were difficult to move across. In addition, much of the area was very wet during parts of the year. Trails blazed by bison were often used by people to navigate through and across virgin prairie.
65. True or False: Many early settlers were struck by the beauty of the Illinois prairie with its vast expanse of green and colorful patches of purple, yellow, pink, white and orange flowers.
True - The various shades and textures of the grasses contrasted with the colorful patches of flowering forbs and were often mentioned in the journals of early visitors and settlers to Illinois.

66. True or False: The grasses in a tallgrass prairie are all over six feet high.

False - The tallgrass prairie does contain species, like big bluestem, Indian grass and cord grass, that are often over six feet tall, but other species of grasses occur there that are much shorter, including little bluestem, side-oats grama, prairie dropseed and June grass.

67. True or False: Early settlers compared the prairie to oceans.

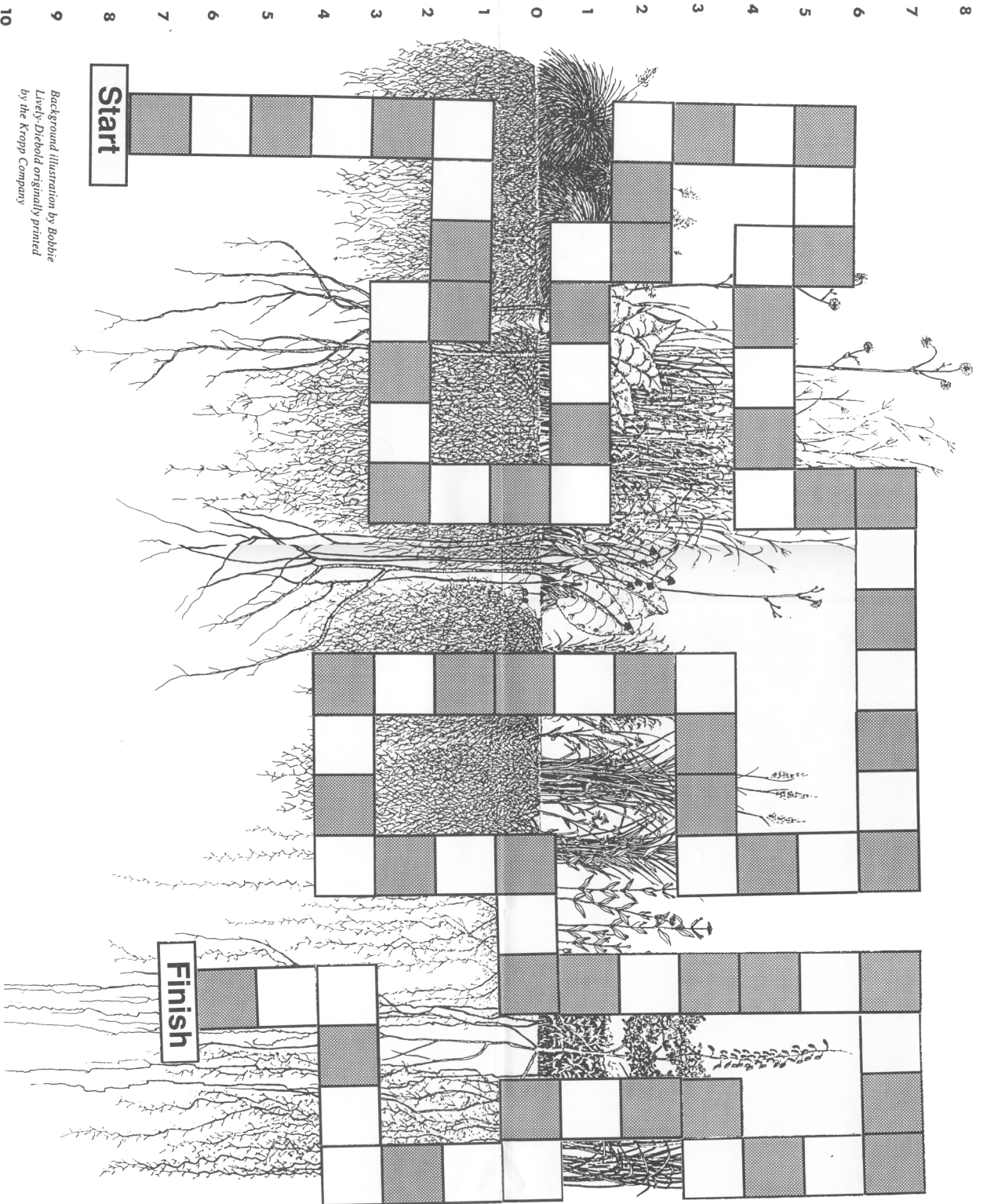
True - Because of the vastness of the land and its rolling topography, the motion of the grass in the wind and the changing light and shadows, the prairie landscape gave the illusion of heaving and swelling, much like the sea.

68. True or False: Wooded areas often lie along streams and rivers that cut through a prairie.

True - Streams and rivers often acted as barriers to prairie fires and allowed woodlands to persist. These woodlands are not islands of trees planted by birds and other creatures but remnants of forests that existed after the glaciers left because they were protected from the raging prairie fires.

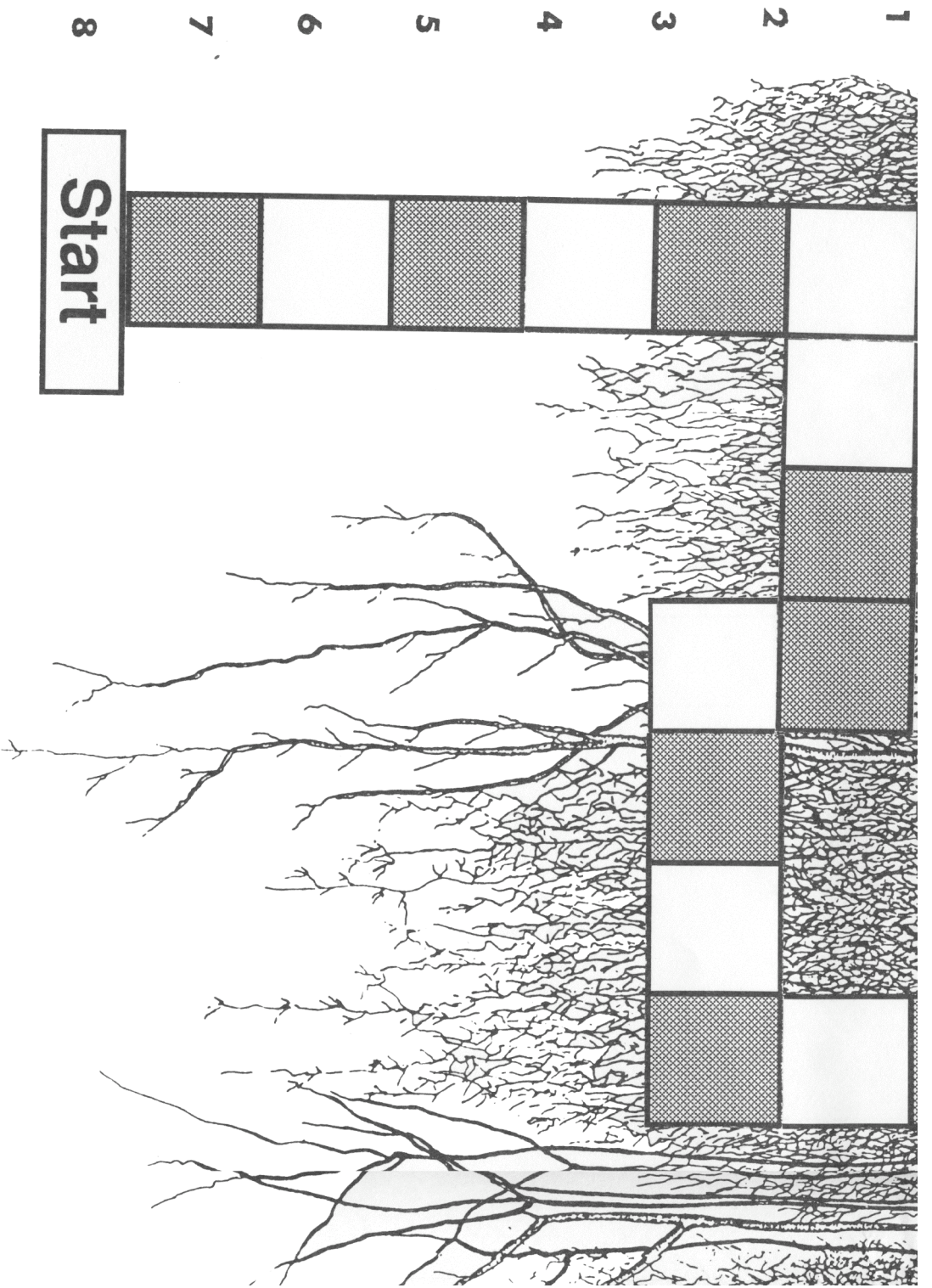
69. True or False: Trees did not and could not grow on the tallgrass prairie.

False - Trees did grow on the prairie. They existed in places protected from fires. Species that were fire-resistant, for example, thick-barked oaks and hickories, survived and thrived on the prairie. Where these trees intermixed with prairie vegetation, a unique habitat formed, known as a savanna.



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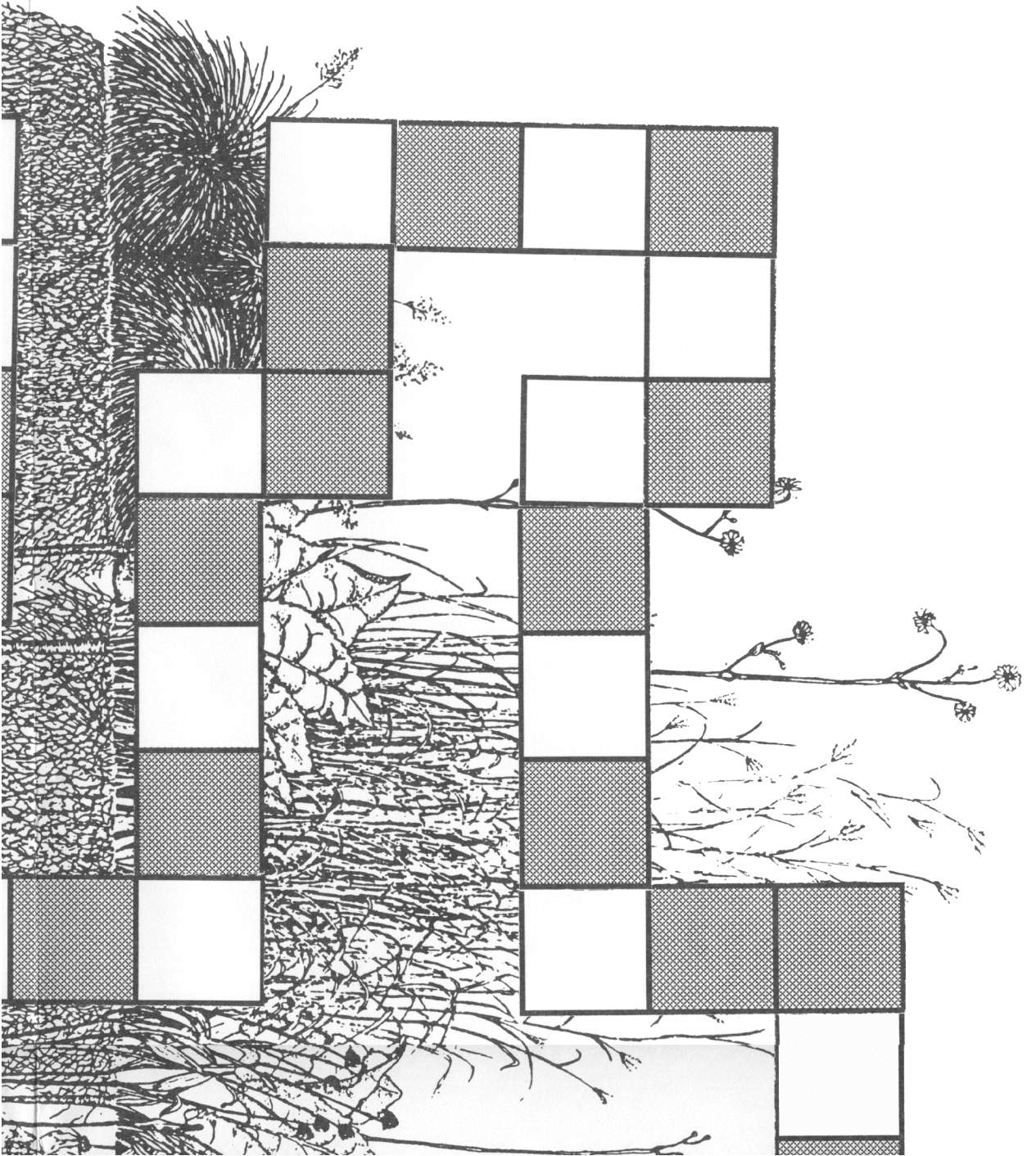
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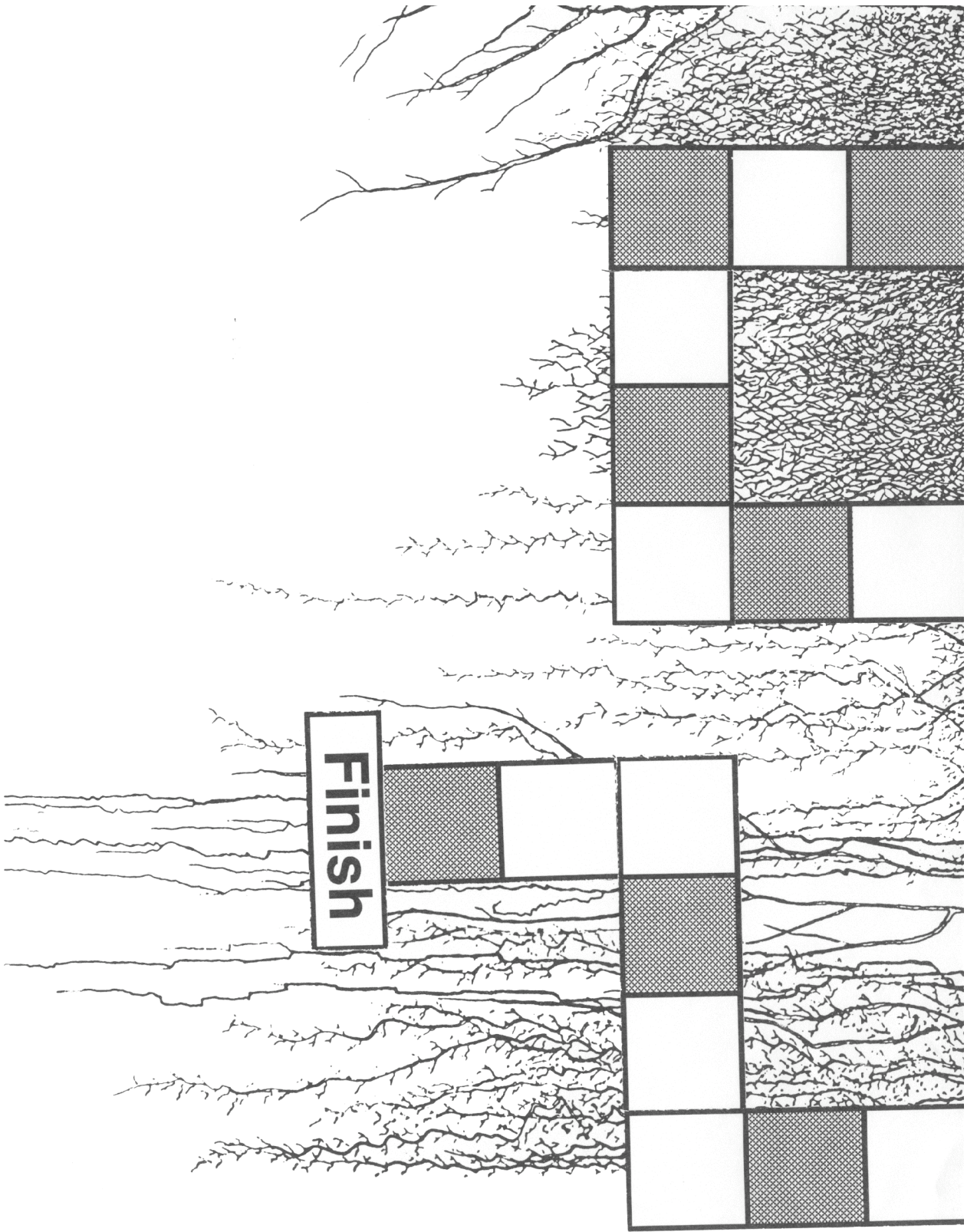
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