

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

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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?

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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). Student Page I (a list of true and false questions with answers). one die, four game tokens (buttons, coins, 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

I. Make a copy of Student Page I 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.

Introducing the Activity

Ask students if they are familiar with *Jeopardy*, the television game show. Write the two answers shown below on the chalkboard and ask students to come up with the appropriate questions. Did they succeed? Announce that they will now play a game that will introduce them to prairie ecosystems.

Answer 1: fire, grazing, climate

Question 1: What are three factors that allowed prairies to develop in Illinois?

Answer 2: big bluestem

Question 2: What is one of the dominant grasses in the tallgrass prairie ecosystem of Illinois?

Procedure

Rules of the Game

- I. Each group of five students (four players and a judge) requires a game board. The judge holds a copy of the Student Pages, the true and false questions with answers, 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, after answering true or false, 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 grass." The answer is "true." The abbreviated statement on the board might be, "Prairies are mostly grass." Although this statement is true, it can also be true for disturbed grasslands. What distinguished the two 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, "What Is a Prairie?"

Extending the Activity

Students search through magazines and books for pictures of prairies and other grassland habitats (photocopies are acceptable) or visit nearby grass- land habitats and take snapshots of those habitats. Assemble the picture 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.

State Goals

11, 12

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: True or False Questions and Answers

1. The tallgrass prairie is a recently formed (within the last 12,000 years) ecosystem.
(T -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. The tallgrass prairie has most of its plant material (biomass) in the form of grasses.
(T-As much as 80% of prairie biomass consists of grasses; however, only 20% of the plant species are grasses.)
3. The typical front lawn is an example of a prairie and is made up of native grasses.
(F-Most lawns are nonnative (from other parts of the world), cool-season grasses such as Kentucky bluegrass. They form carpets and do not grow as tall as most native prairie grasses.)
4. Sixty percent of Illinois was once covered with tallgrass prairie.
(T-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. Sixty percent of the plant material (biomass) in a tallgrass prairie is found below the surface of the soil.
(T -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 produce the next year's growth. Prairies grow a new crop of above-ground vegetation each year.)
6. If you allow corn and soybean fields to lie fallow (unplanted) for a year or two, tallgrass prairie grows in their place.
(F-So little prairie remains in Illinois that no seed source large enough exists to allow abandoned farm fields to be recolonized by prairie vegetation. What comes up is mostly alien (nonnative) weeds with a few of the weedier, early succession native plants- for example, goldenrods-mixed in.)
7. Prairies developed after the last continental glaciers receded from the Midwest.
(T-But it took some time because immediately after the glaciers the Illinois landscape was more like a subarctic landscape. As the land warmed and dried, however, 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. Examples of tallgrass prairie are easy to find in Illinois today.
(F- The prairie is one of the rarest ecosystems in Illinois today, simply because the soils of prairies are so rich that nearly all them have been converted to agriculture. Today only about .01%--- one- hundredth of one percent !--- of the tallgrass prairie is left.)
9. The prairie dog was an important component of Illinois prairies.

- (F- The prairie dog lives in shortgrass prairies found in the drier West. They were not a part of the tallgrass prairie ecosystem found in Illinois.)
10. The first European explorers and settlers in Illinois had seen and experienced prairies before.
(F-They 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. It soon evolved into *prairie*.)
11. 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.
(T -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 off.)
12. Prairie grasses grow in clumps or bunches.
(T -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 broad leaf plants. Our yards and lawns are made up of carpet-forming grasses.)
13. Most of the plants that make up the prairie ecosystem came from other habitats.
(T-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. The roots of prairie plants are very shallow. (F-Prairie roots are very deep, with as much as 60% 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. In today's world, prairies do not need fire. (F-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. Prairies die each fall and replace themselves only from seeds that fell the previous year. (F-Prairies have living parts below ground that are perennial-roots, corms, rhizomes, tubers, etc. These are insulated from temperature extremes and from fire and produce next year's prairie vegetation.)
17. Prairie grasses grow best when the weather is warm or hot.
(T -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. 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.
(T -Prairie formed mostly during a warmer and drier period, the Hypsithermal. Those conditions also promoted fire 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. The large, rounded granite boulders found on the prairie came from the bedrock below the prairie soil.
(F-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. Fires favor grasses over trees.
(T- 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 grass 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. Tallgrass prairie forbs are found nowhere else but on the prairie.
(F-Prairie plants did not evolve in a prairie ecosystem but colonized from other habitats such as open woodlands, floodplains, and barrens.)
22. The bison consumed more prairie vegetation than any other group of animals.
(F-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. There were (are) many different types of prairie in Illinois.
(T -Illinois has sand prairies, wet prairies, black soil prairies, gray prairies, gravel terrace prairies, dolomite prairies, and hill prairies-each 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 type.)
24. The rich Illinois soil formed very quickly under prairies-in only about 2,000 years.
(T -Prairies soils were formed from glacial debris and wind-blown glacial flour-pulverized rocks- called loess. Prairie vegetation contributed organic material 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. Kentucky blue grass, smooth brome, and tall fescue are examples of native prairie grasses.
(F- These are nonnative species or aliens that come from other parts of the world.)
26. The prairies were easily plowed by early European settlers using a team of oxen and a wooden plow.
(F-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 1-3 acres in a sunup to sundown day.)
27. Prairie soils were not very good because few trees grew on them.
(F-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, perhaps in a wet spot or along a river, trees grew just fine.)

28. Big bluestem, Indian grass, and switch grass are examples of native prairie grasses.
(T-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. A clump of prairie grass 8 feet tall can have roots that penetrate the soil to a depth of 10-12 feet. (T-Prairie grasses are extremely deep-rooted; upwards of 60% 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. Forbs are broad-leaved flowering plants that are usually pollinated by insects.
(T -Although most of the biomass (80%) in a prairie is grass, most of the species (80%) 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. Not many species of plants and animals lived in Illinois prairies.
(F-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. 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.
(T-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 just 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. Grassses are wind-pollinated plants and do not need showy flowers to attract insect pollinators.
(T -Prairie grasses usually flower in mid- to late- summer; the pollen is distributed among plants by the ever present winds.)
34. As the season progresses, prairie grasses grow tall. The forbs must also grow tall if they are to compete for sunlight and attract pollinators.
(T -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. Illinois was part of the shortgrass prairie ecosystem.
(F-Illinois was partially covered by what is called the prairie peninsula of tallgrass prairie. Shortgrass prairies occurred further west, nearly occupying the rainshadow of the Rocky Mountains. A good rule of thumb: the farther one progresses from the Rockies, the wetter the climate becomes and the taller the prairie grasses grow.)
36. Prairie fires killed most of the prairie vegetation. (F-Fire, in fact, 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 tied up in dead plant material and makes them available for use by the still living below-ground prairie plants. These plants survive because soil is a good insulator and protects them from the heat of fire.)
37. The rows of Osage orange are remnants of old forests. Early settlers left these single rows of trees for windbreaks.
(F-Osage orange was native only to Arkansas, Oklahoma, and Texas. Early settlers planted the hedgerows as windbreaks, but they do not occur naturally on the prairie.)
38. The word *prairie* comes from the Native Americans and means "land where the buffalo roam free."
(F-*Prairie* is from a French word meaning meadow.)
39. Chickens that were brought with the European settlers and escaped to the wild became known as prairie chickens.
(F-Prairie chickens are a native prairie 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.)
40. Most of the Illinois tallgrass prairie was a very dry ecosystem.
(F- 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. Ring-necked pheasants were an important native prairie bird.
(F- The pheasant is a Chinese bird that was introduced into North America during the middle of the nineteenth century. It successfully outcompetes native prairie chickens when the two species occupy the same habitat.)
42. Prairie potholes were formed where dirt was taken by early settlers for sod houses.
(F-Prairie potholes were shallow depressions scraped out and left by glaciers. They usually held water during the wettest parts of the year. Sod houses, in fact, were little used in Illinois.)
43. Soybean was a native prairie plant that has become domesticated.
(F-Soybean is an imported plant from China. It was brought to Illinois about the same time as the ring-necked pheasant.)
44. The ponds along interstate highways are examples of prairie potholes.
(F-These ponds are called borrow pits. They were created when soil was removed to build the raised roadbeds and interstate overpasses.)
45. Queen Anne's lace is an indicator of a high quality prairie.
(F-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. Oxeye daisy is a native of drier (xeric) prairie areas of Illinois.
(F-Oxeye daisy was introduced into North America by European settlers.)
47. Spiderwort is a spring-flowering native prairie plant.
(T -It grows on drier sites in prairies and wood- lands and does very well in sand

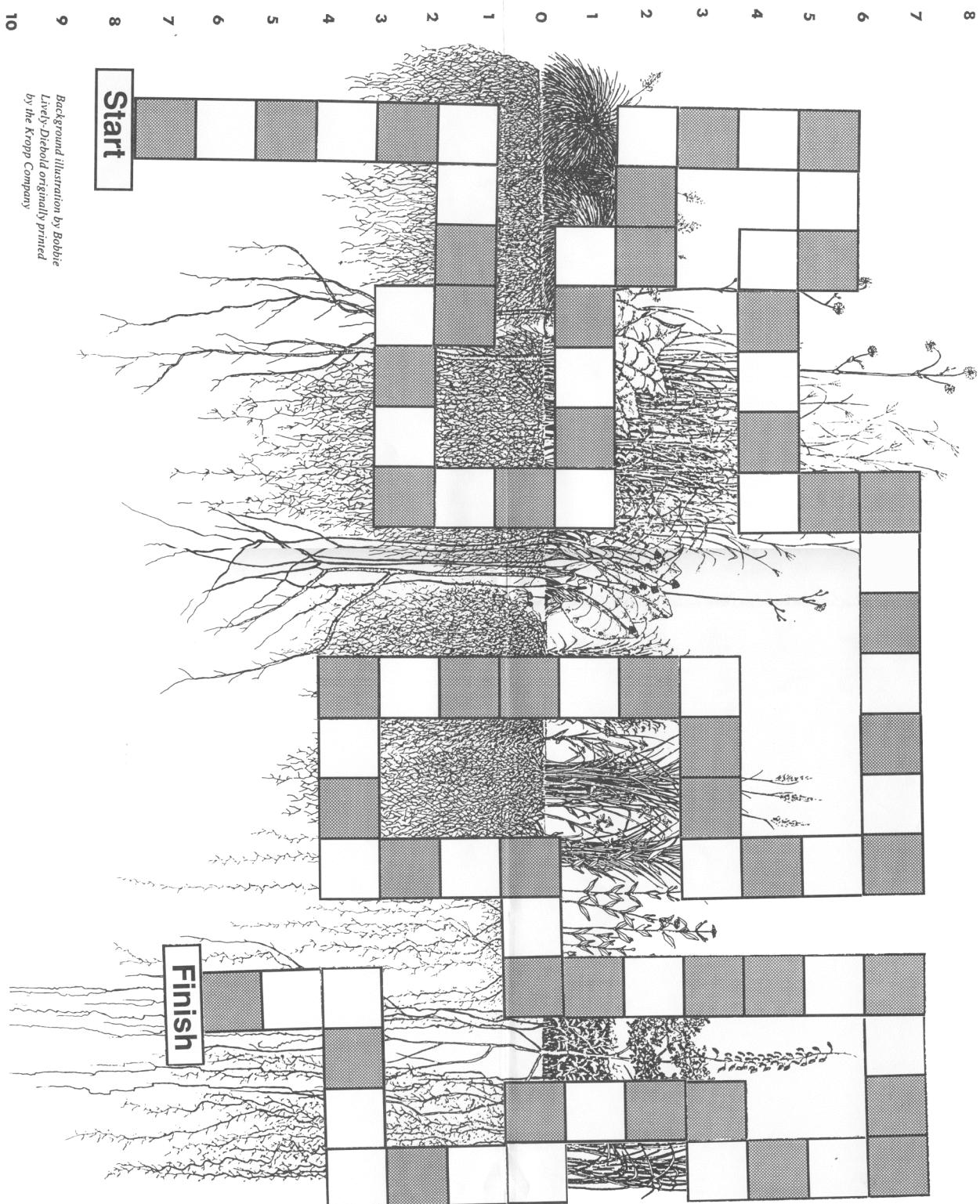
- prairies.)
48. Jerusalem artichoke was introduced from the Middle East and became the scourge of the prairie.
(F-Jerusalem artichoke is a native prairie sun-flower. Its starch tubers were an important food for Native Americans and early settlers. It is still eaten today.)
49. Bison never occurred east of the Mississippi River.
(F-Bison, also known as buffalo, once ranged as far east as New Jersey.)
50. Rattlesnake master was important to Native Americans and early settlers as a tonic to tame aggressive reptiles.
(F-Rattlesnake master was once thought to be useful in treating snake bites, but its efficacy has proved unfounded.)
51. Due to their delicate root structures, no native prairie plants have been adapted for use in the garden.
(F-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. Illinois is known as the prairie state because it contains more than 90% of its original prairie vegetation.
(F-Illinois is called the prairie state because it once contained 21.4 million acres of prairie. Only about 2,500 acres, less than .01%, of the original prairie remain in Illinois.)
53. 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.
(T -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 important today in the maintenance of prairie remnants.)
54. There are no woody plants native to the prairie. (F-Several plant species that occupied prairies are considered woody-hazelnut, New Jersey tea, and lead plant are only a few of the species.)
55. Any field dominated by grasses is a prairie. (F-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. Most prairie flowers bloom in the spring before they are shaded by the grasses.
(F-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. Prairies grow only on very flat ground, and that is why it dominated much of Illinois.
(F-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. The honey bee is an important native pollinator of prairie plants.

- (F- 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. Some prairie plants are pollinated by only one small group or a single species of insect.
(T-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. Native Americans were able to obtain much of their food from prairie plants.
(T -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. Native Americans obtained much of their medicines from prairie plants.
(T -Plants such as purple coneflower and snakeroot provided tonics. Wild quinine was used as a cure for fevers.)
62. The gray wolf was an important predator on the prairie, feeding on bison, elk and deer.
(T -But the species was extirpated from Illinois very early in its colonization by Europeans, around the end of the 1800s.)
63. The coyote, or prairie wolf, was extirpated from Illinois in the early 1900s.
(F- The coyote remains common in Illinois and has adapted very well to the current landscape.)
64. Prairies were easy to travel across because they were flat and covered with grass.
(F- The prairie vegetation was tall and 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. 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.
(T -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. The grasses in a tall grass prairie are all over six feet high.
(F- The tall grass 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 gramma, prairie dropseed, and Junegrass.)
67. Early settlers compared the prairie to oceans. (T -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. Wooded areas often lie along streams and rivers that cut through a prairie.
(T-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.)

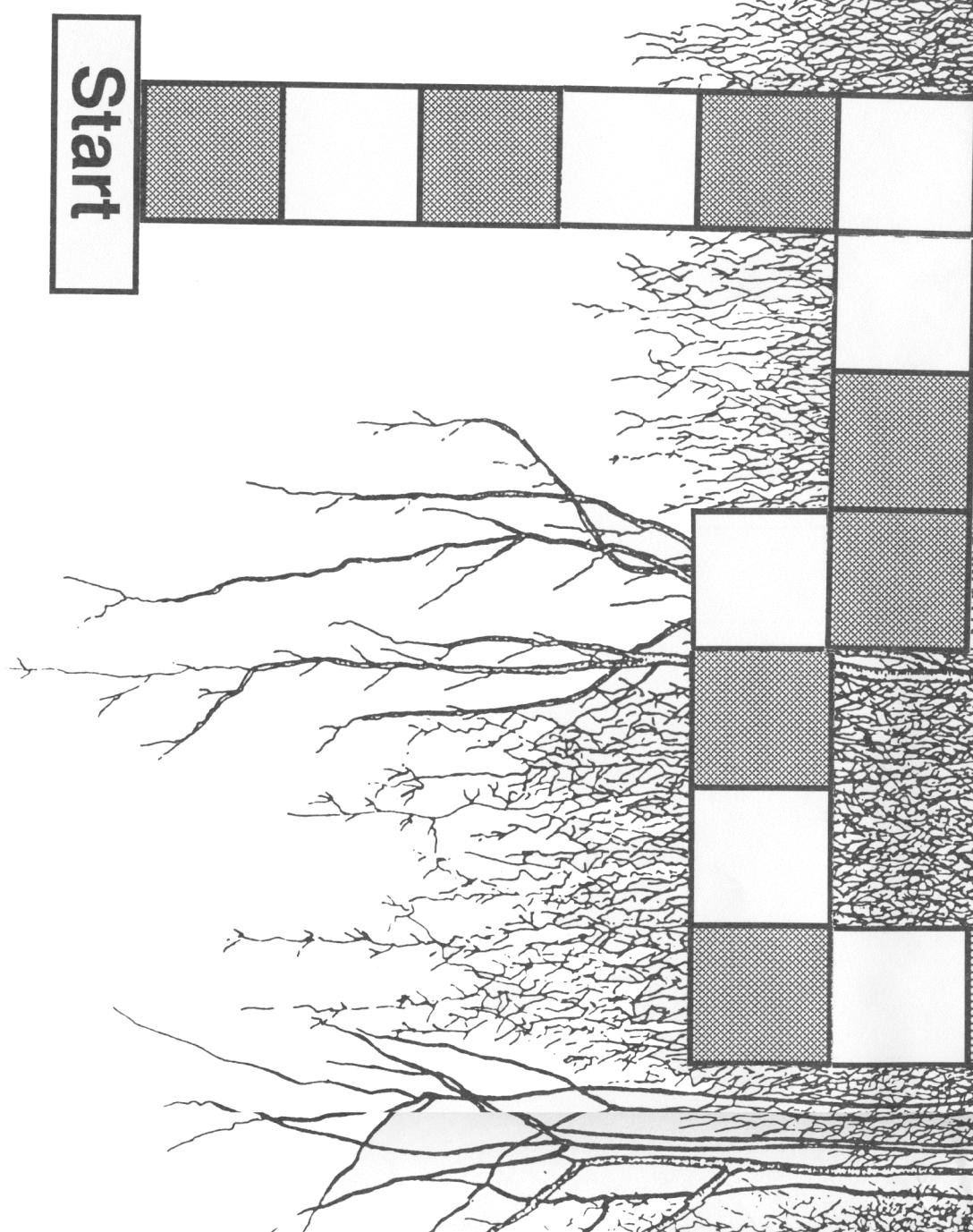
69. Trees did not and could not grow on the tallgrass prairie.

(F- 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 and beautiful habitat formed-a savanna, a vista dominated by prairie vegetation with large, fire-resistant oaks widely spaced across the landscape.

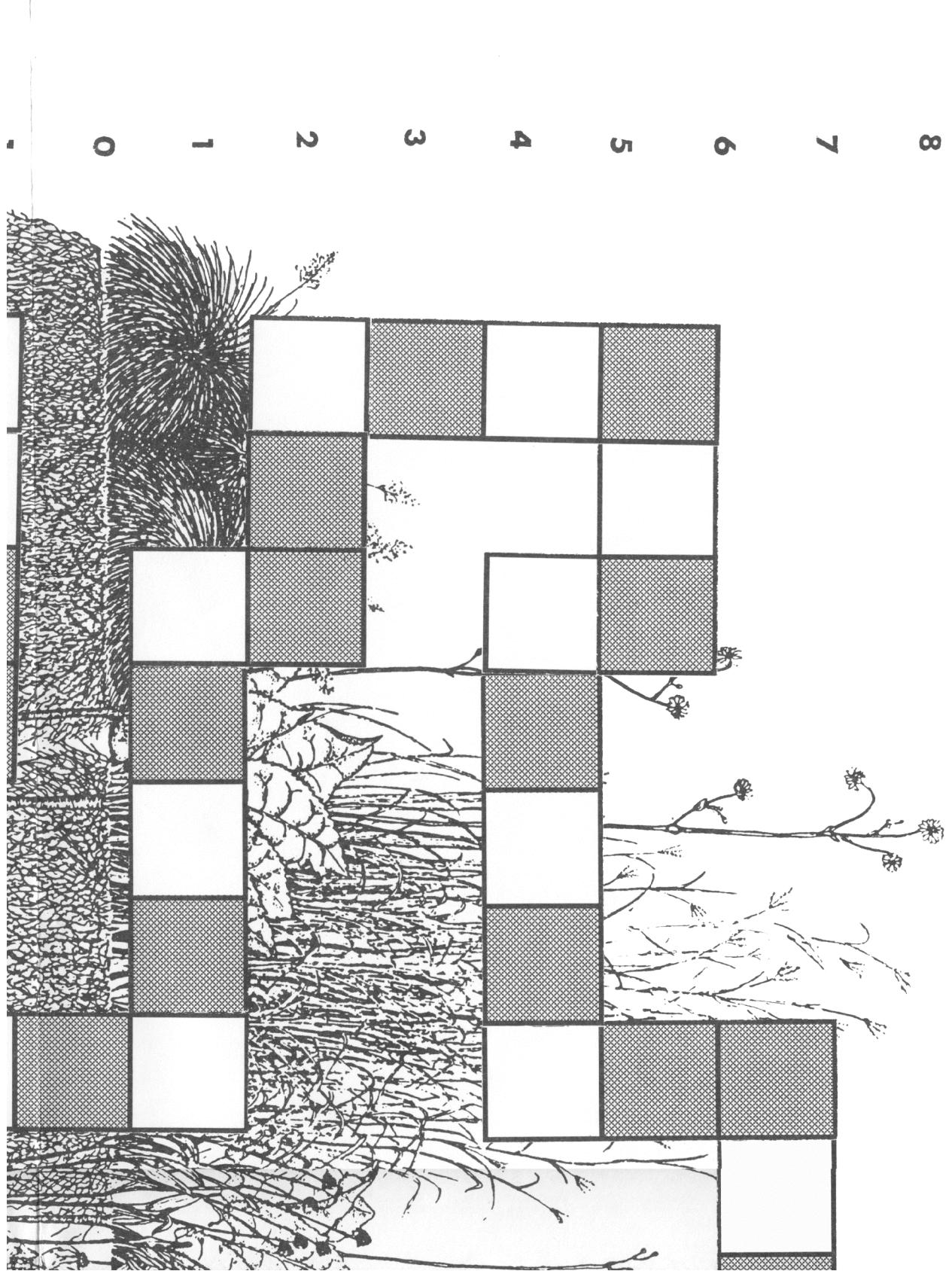


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