

# Mysterious Land: Discovering Illinois

**OVERVIEW:** This group activity introduces students to six different phases in the dramatic story of the landscape of northeastern Illinois. After analyzing materials designed to familiarize them with each phase, students share the information. They then discover that all of the locations were the same-Illinois!

## ILLINOIS LEARNING STANDARDS

Social Science: 16, 17 Science: 12 Language Arts: 2, 4

## GEOGRAPHY THEMES

Physical Characteristics of Place

Regions: How They Form and Change

## NATIONAL GEOGRAPHY STANDARDS

Element: Places and Regions

Standard 4: The geographically informed person knows and understands the physical and human characteristics of place.

Standard 5: The geographically informed person knows and understands that people create and define regions to interpret Earth's changing complexity.

Element: Physical Systems

Standard 7: The geographically informed person knows and understands the physical processes that shape patterns on Earth's surface.

Element: Applying Geography to Interpret the Past and Present and Plan for the Future

Standard 17: The geographically informed person knows and understands how to apply geography to interpret the past.

## **OBJECTIVES**

Students will

1. analyze written materials for specific information.
2. organize information collected into a group report.
3. locate their region on a map of the United States.
4. analyze thinking processes used to form conclusions.
5. individually synthesize information into a written description.

## **MATERIALS**

Students: One per group

Group Instruction Sheet  
Assigned Group Information Sheet/s (1-6)  
Notebook and pencil  
Watch  
Sticky Notes

Teachers:

- A.1: Geologic Time Scale
- A.2: Paleogeography of Illinois-Indiana Region
- A.3: Time of Tropical Seas.

## **ADVANCED PREPARATION**

1. Make six copies of the "Group Instruction Sheet" and one copy each of the six "Group Information Sheets."
2. Make overheads of "A.1: Geologic Time Scale;" "A.2: Paleogeography of Illinois-Indiana Region;" and "A.3: Time of Tropical Seas" for discussion.

3. Make sure you have a large wall map of the United States.
4. Look over the Group Information Sheets to familiarize yourself with the background information and student materials.

## **INTRODUCING THE ACTIVITY**

1. When introducing the activity, do not tell students that the activity they are working on has anything to do with Illinois. This is a discovery they will make on their own/with your help at the end of the activity.
2. Explain to students that they are going to be detectives and try to identify their mystery region somewhere in the United States from the clues supplied. Their goal as a group will be to take the information given and extract the important facts to present to the rest of the class. When everyone has given their reports, the class will try to deduce where their region is located in the United States.
3. Divide the class into six groups and redistribute the groups around the classroom so that each has its own working space.
4. Pass out the "Group Instruction Sheet." Read over the tasks of the reader, the recorder and the timekeeper. Tell students that those in the group who do not have an assigned job will be the presenters and will be responsible for presenting their group's report to the class.
5. Make sure they know the rules for brainstorming if they are not already familiar with this process. a) All ideas are written down. b) No one is to critique anyone else's idea at this point in time.
6. Give the groups time to decide who will be responsible for each task. Circulate as they are trying to decide and if they can't make a decision, you will have to help facilitate the decision making process. Deciding on their own is an important cooperative skill.
7. Go over the steps they are to take as they try to distill the information in order to answer the questions on the sheet. Once they have a number of ideas for each question, the next step will be to begin the process of choosing the best of their ideas for the presentation.
8. Students sometimes get so wrapped up in the brainstorming that they forget to pick a name for their region. Remind them that they need to complete this final step.

9. Ask if there are any questions before the class starts the assignment. Deal with any misunderstandings.

## **PROCEDURES**

1. Assign the students an allotted period of time (15 or 20 minutes) to complete the assignment. Remind the timekeepers that they will have to alert the group when 5 minutes are past and also when there are 3 minutes left so that the groups can decide on a name for their region.

2. Encourage students to refer to the "Group Information Sheet" for answers to questions about how to proceed before they ask you for help.

3. Pass out the "Group Information Sheet" and allow the students to start. Circulate to handle any problems within the groups and to help clarify any misconceptions. Group 2 may have trouble initially because they only have illustrations but that will not be a handicap for long. Encourage students to use what they know about the plants/animals on the Information Sheet to deduce the type of environment that would produce those fossils.

4. Keep an eye on the clock. Do not say 5 minutes are up, etc., but do ask if timekeepers are keeping track of the time.

5. When time is up, have each group in turn present their information to the class along with the name they have chosen for their region.

## **Concluding the Lesson**

1. When all presentations are complete, ask each group to try to identify their region on a wall map of the United States. You may want to either give groups a short conference time to come up with their decision or open the discussion to all the students immediately. Have each group label a small Sticky Note with the name of their region and place it on the map where they think it should be.

2. As they make their choices, have them point out the important clues such as directions/references to nearby landmarks that they used to make their decisions. Have the groups try to guess the regions in the order in which they are numbered since the description with the most recognizable clues come from Group 6.

3. Take time to dwell on the reasons for the choices that were made. Examining their reasoning methods helps to clarify what the processes were that led to the final conclusion/s.

4. If students do not discover for themselves where the single mystery region is, then you can go through the group information and point out that these are all the landscapes of Illinois at some time in the past. Illinois has changed dramatically from towering volcanoes to a huge inland sea to lush swamps and then to glaciers. The most recent change has been from a land of prairies, savannas, and woodlands to the present day landscape of cities, towns and farms.
5. Use the overheads provided to aid in discussion.

### **ASSESSING THE ACTIVITY**

A pretest can be given in the form of an assignment that requires students to write what they know about the landscape of Illinois. The length of the writing assignment is optional. When students have completed the Mysterious Land activity, ask them to again write a description of Illinois. After the second paper is graded, hand back both papers so that students can see how much more they now know about the area. Group grades can also be given on the report/how they worked in their groups.

### **EXTENDING THE ACTIVITY**

If you have access to fossils of brachiopods, bryozoans, crinoids, etc. from the time when there were ancient seas over parts of Illinois, you can use those instead of/with the illustrations for Group 2. Also, plant fossils can be used to supplement the Group 4 information. If you do not have access to fossils, check with an earth science/biology/geography teacher. In the Chicago area, the Field Museum has exhibits they will loan to teachers.

### **Special Information**

The Group Information Sheets for students have sources listed when they do not have Illinois listed in the title. On the Group 2 Information Sheet, the fossil drawings are from the Illinois State Museum Teacher Guide and the two pictures are from Schubert, pp.. The Group 6 Information Sheet is original text. See the source list below.

### **REFERENCES**

Schubert, Christopher J., A View to the Past: An Introduction to Illinois Geology, Illinois State Museum, 1986.

Runkel, Sylvan T. and Dean M. Roosa, Wildflowers of the Tall grass Prairie: The Upper Midwest, Iowa State University Press, Ames, Iowa, 1989.

Illinois State Museum, Summer Teacher Training Field Trip Guide, 1990, Illinois State Museum, Springfield, IL, 1990, 87.

## **INSTRUCTIONS FOR THE GROUP**

**CHOOSE:**

1 person to be the reader if you have information to read.

1 person to be the time keeper.

- The group has a total of \_\_\_\_\_ minutes to complete the assignment.
- Let the group know when the first 5 minutes are up.
- Let the group know when there are 3 minutes left.

1 person to be the recorder who is responsible for writing down all of the brainstorming ideas.

The remainder of the group is responsible for presenting the information to the rest of the class.

**READ:** If you have information to read, the reader should read the material through one time aloud, and then go back and read it a second time so that everyone has a chance to absorb all of the information.

**BRAINSTORM:** Using the information you have been provided, **EVERONE** should help come up with some ideas for each of the questions. Answers should be descriptive!

**QUESTIONS:** Describe these characteristics:

- What was the weather like in this region? (Atmosphere)
- What was the land like in this region? (Lithosphere)
- What kinds of people/plants/animals lived in this region? (Biosphere)
- What sources of water were available for them? (Hydrosphere)

**PICK:** Pick 2 or 3 of the best ideas for each question making sure to give a good **DESCRIPTION** for each so that the class will understand what the region you are reporting on is like.

**DECIDE:** In your last few minutes, decide on a good descriptive name for your region.

**FINALLY:** Share the name and description of your region with the class.

# Overview

## Physical Geography of the Formation of the Many Landscapes of Northeastern Illinois

The northeastern Illinois landscape has changed dramatically over the last billions of years. It is changed from towering volcanoes to a huge inland sea to lush swamps and then to glaciers. Many of those former landscapes have been completely eradicated from the surface, and their only record lies buried deep beneath the surface of present-day northeastern Illinois. Fortunately, those changes have been unearthed by geographers and geologists who have drilled and dug-into the land to reveal its secrets.

Cycles like that of glaciation have left their marks on the surface of the earth and can be recognized by those who learn to "read" the land. The changes wrought upon the northeastern Illinois landscape by glaciers are responsible in part for the numerous gravel and sand quarries in the region and the ridges that periodically interrupt the predominantly flat landscape. The present day course of many northeastern Illinois rivers flow through wide valleys cut by the torrents of meltwater produced by retreating glaciers.

The most recent change has been from a land of prairies and wetlands to the present day landscape of cities, towns and farms. The prairies and wetlands that were so abundant at the time the first settlers came to ignore to the northeastern part of Illinois are almost completely gone except in small pockets where they have been protected or hidden from the encroachment of civilization.

The story of northeastern Illinois has been unraveled from evidence buried deep in the earth beginning 1.5 to 1 billion years BP (Before Present). Earth was a very different place then. The physical forces active at the time were very dramatic. There were majestic volcanoes dotting the landscape, and clouds of super heated ash, dust and gas reached high into the sky at times even blotting out the sun. The energy released was sometimes as much as 10 million tons of TNT. The lava flowing down the side of the volcano could reach initial speeds of 300 miles per hour. (Shuberth 1986,56)

After a long period of time measured in millions of years when the volcanoes were actively growing, there followed a period of inactivity. The shattered cones stood quietly and were deeply eroded and perhaps even destroyed altogether. Of approximately 1 billion years BP during a second phase, intense violent activity occurred, and volcanoes again became a major feature of the land. These volcanoes did not erupt with the force of earlier volcanoes. The magma from these volcanoes

solidified deep beneath the earth because there was not enough force for the magma to rise to the surface. As it solidified, the magma was changed to granite. As most of the volcanic cones were eroded away, the granite was exposed. The landscape then became one of granite mountains that were sometimes 1,000 feet high. (Schubert 1986, 58) The evidence and the rocks tell its story.

"Nothing lived on the lands. No plants nor animals, not even insects, lived in the valleys and mountains, on the plains and plateaus, or on the volcanic cones. The land was uniformly gray, reddish-brown, and brown wasteland --stark, barren, and empty. Only the ferocious blasts and powerful shock waves from the erupting volcanoes shattered the unearthly stillness." (Schubert 1986, 58)

Around 525 million years ago, the once majestic volcanoes were eroded to rugged hills which became the islands when they were submerged under a deepening sea that was invading the North American continent. As this late Cambrian sea advanced and then retreated, thick layers of sand, clay, and silt were deposited over what would one day become northeastern Illinois. This cycle of retreat, erosion, and then a readvance of the sea resulted in the deposition of a valuable sandstone, St. Peter Sandstone. The formation is exposed along the Illinois and Fox Rivers near Ottawa at Starved Rock State Park and nearly LaSalle at Matthiessen State Park. The St. Peter Sandstone found in Illinois today marks the location of the ancient mid-Ordovician shoreline. (Schubert 1986, 66-67) The people of northeastern Illinois and the Illinois and Michigan Canal region, in particular, owe many of their jobs to the rich deposits of sand laid down during this period of inland seas.

During the Silurian time from 430 to 395 million years ago, Illinois was almost continuously under the sea. The Silurian seas developed extensive coral reefs that stretch from what is now the Ozark region of Missouri northeastward across Illinois, Indiana, Ohio, western New York, and northern Ontario. The reefs supported a wide variety of corals, bryozoans, brachiopods, crinoids, trilobites and nautiloids. They were part of a bright colorful world of great beauty. The many fossil records found in the maritime limestones that formed at that time help explain the abundant variety of life found in the Silurian seas.

Over the next several hundred thousand years, the continent went through a long period when it would be uplifted and then it would subside. The seas would transgress or move over the land of northeastern Illinois and regress or move back to their former position repeatedly as the land went through these periods of uplifting and subsiding (see map). Southeastern Canada had a higher elevation than Illinois so river systems from Canada flowed into Illinois. The huge delta of the ancient Michigan River that flowed south out of Canada dumped immense sediment loads over the lands. When the waters were not covering the land, a vast coastal swamp with lush



jungle like vegetation was formed. Those swamps were very similar to the Everglades in Florida today, with huge trees unlike anything that grows on the lands today. (Schuberth 1986, 86) The vast deposits of bituminous or soft coal created from the former vegetation of these junglelike swamps would one day become an important resource in northeastern Illinois!

Of all the cycles that the lands of northeastern Illinois went through, the ones that left the greatest legacy to our present population are the Ice Ages. The flat lands and the rich black soil of this part of the state can be traced directly to the glaciers. What was it like during these glacial period? The weather was extremely cold and erratic because of the presence of an immense frozen into the base of the glaciers gouged and polished the land. Many of the rocks at the base of the ice were ground into fine rock flour that was later to become the parent material for our soils. This scraping action smoothed down the hills and filled valleys. (National Parks Service, no pp.)

Even as the ice margin melted back, it generally continued to flow, delivering and releasing debris at its edges and forming other newer hills on the Illinois landscape. These hills that are such a prominent feature of the northeastern Illinois landscape today are called moraines.

Meltwater from the glacier often formed lakes either between moraine ridges or between the moraine and the ice front. When they drained, broad, flat to lake beds or plains remained. This city of Chicago is built on one of these flat lake beds! At times, the meltwater released from the glacier or the lakes would break through the moraines cutting wide channels. (See the map on the preceding page.) The valleys of the Fox, Des Plaines, and Illinois Rivers were all cut by the torrential glacial meltwater. (National Park Service, no pp.)

In the intervening years, the Lake Michigan Basin and, at times the entire Great Lakes Basin, drained south through the Des Plaines-Illinois River Valley. About 11,000 years ago, the Wisconsin glacier retreated northward from the Lake Michigan Basin for the last time, and 4000 years BP, the modern Great Lakes drainage system formed. After that, no water from Lake Michigan flowed to the Illinois Valley until the Illinois and Michigan Canal was dredged in the 1800's. (National Park Service, no pp.)

The landscape of northeastern Illinois when the first European settlers came was one of prairies, wetlands and woodlands that had developed on the rich soil of the plains formed after the retreat of the glaciers. The best way to get a good picture of the region and the life of the people that lived on the prairies, the predominant landscape of northeastern Illinois, is to read first hand accounts. The following is from a letter from Lucinda Rutherford shortly after she settled in northeastern Illinois.

"The praires here are delightful. They are from 12 to 20 miles wide, and 150 [miles] long. Instead of the timber surrounding them, they surround the timber. At this season they are most beautiful. The green grass has sprung up and covered the whole bosom of these wastes and with that grass their springs up a multitude of flowers of every hue, form, and scent. It is delightful to ride over this level land with every step tramping those gems of nature underfoot. Their beautiful heads can be seen as far as the eye can reach waving in the summer wind." (Runkel and Roosa 1989, 38)

The picture that Lucinda's letter paints is one of beauty and harmony, but not everyone had the same view of the prairies. Life, for many, was neither pleasant or easy. The prairie was intensely hot during the summer months. There were droughts, crop failures, and prairie fires that destroyed wheat fields causing shortages of food during the winter months. There were hordes of biting insects that would nearly cover the bodies of horses and riders driving both into a mad frenzy. (Runkel and Roosa 1989, 39) In deep winter, the winds blew out of the northwest, and the prairie was a cold, hard, and cheerless place to live. Then, in late April or early May as the sun warmed the prairie, the prairie flowers would begin to bloom. (Runkel and Roosa 1989, 40).

Today, as you wander along the roads of northeastern Illinois, you will see cities and towns of all sizes. Farm fields fill in the spaces not occupied by towns. Occasionally you will see patches of prairie flowers growing in abandoned cemeteries, along railroad right-of-ways, or in protected areas like Goose Lake Prairie. Sadly, that is about all that is left of the once vast prairies that covered northeastern Illinois.

### **Sources**

National Park Service, U.S. Department of the Interior, Ice Age Geology, Illinois and Michigan Canal National Heritage Corridor, Brochure and text by: Illinois State Geological Survey Department of Energy and Natural Resources, no date given, no page numbers used.

Runkel, Sylvan T. and Dean M. Roosa, Wild flowers of the Tall grass Prairie: The Upper Midwest, Iowa State University Press, 1989.

Schuberth, Christopher J., A View to the Past: An Introduction to Illinois Geology, Illinois State Museum, 1986.

### *Maps*

Fentem, Arlen D., "The Physical Environment: Landforms," Illinois a Geographical Survey, Dubuque, Iowa, Kendall/Hunt Publishing Co., 1996.

Schuberth, Christopher J., A View to the Past: An Introduction to Illinois Geology, Illinois State Museum, 1986.

# GROUP 2 INFORMATION SHEET

( \_\_\_\_\_ State museum 1990, 87)

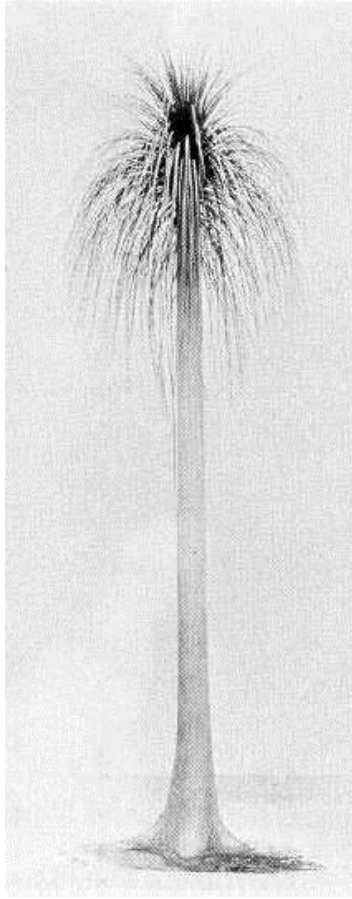


Fossil Trilobites (Schuberth 1986, 53)



Crinoid (Schuberth 1986, 73)

## GROUP 3 INFORMATION SHEET

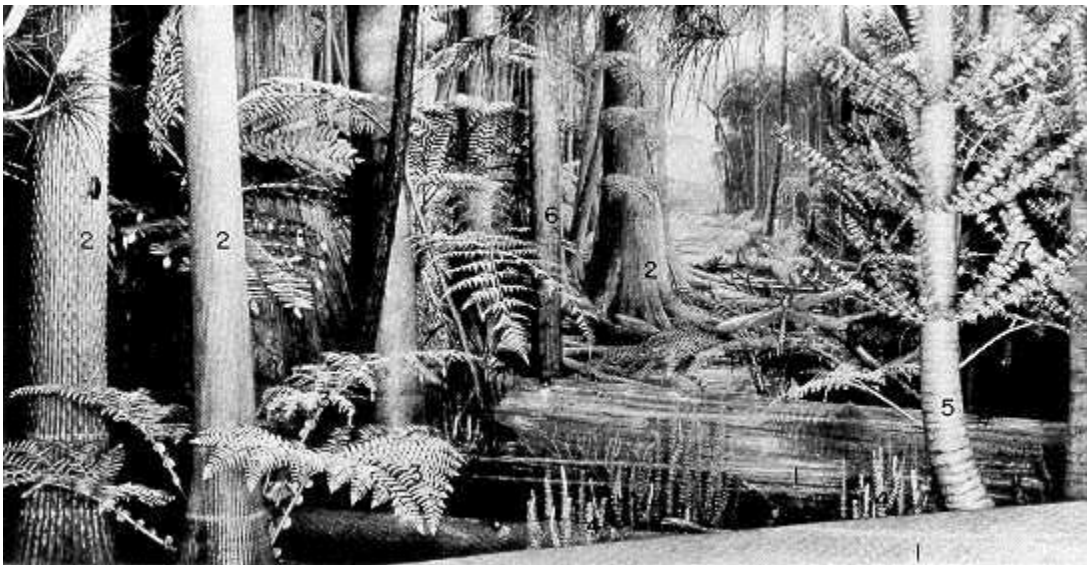


Sigillaria  
(Schuberth 1986, 88)

Millions of years ago, this land region was located very close to the equator or a few degrees south of it. Over millions of years, seas would form over the land and then they would move back. This cycle would be repeated over and over again. When the waters were not covering the land, a vast coastal swamp with lush jungle like vegetation was formed. Those swamps were very similar to the Everglades in Florida today. These swamps were places with huge trees unlike anything that grows on the lands today. The *Lepidodendron* reached heights of a hundred feet or more with a two-foot diameter. These scale like trees had leaves that grew as long as two feet. Another tree, the *Sigillaria*, grew to a hundred feet with a diameter up to 6 feet. It resembled the modern palm tree. Gigantic rush like plants flourished in these swamps along with other smaller plants that formed the underbrush. (Schuberth 1986, 86-87)

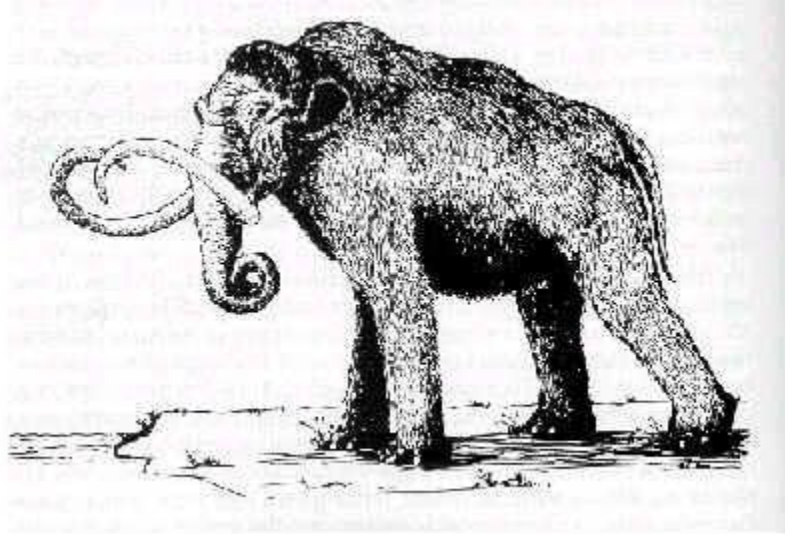
"As the luxuriant plant growth of such a swamp dies, it falls into the water-logged soil. The water, and rapid burial by the quick addition of falling leaves, protect the

twigs, branches, leaves, fruits, and seeds from...decaying. As plant material continues to accumulate, it gradually turns to peat, a porous brown mass of organic matter in which twigs, roots, and other plant parts can still be recognized. With further chemical transformations of the aging organic matter, the plant carbon becomes more concentrated and the peat turns into lignite-a soft coal like material. Greater depth of burial, still more time, and higher temperatures may further change the lignite to bituminous or soft coal." (Schuberth 1986, 94) The coal created from the former vegetation of these jungle-like swamps would one day become an important resource in this region!

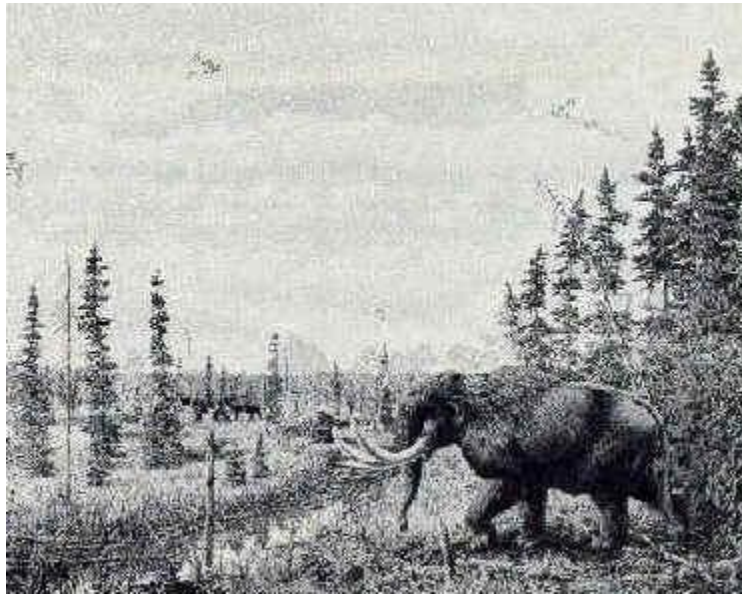


"A Pennsylvania coal-forming swamp reconstructed as a living biome. Our valuable coal reserves developed from swamps such as this." (Schuberth 1986, 90)

## GROUP 4 INFORMATION SHEET



Jefferson's mammoth (Schuberth 1986, 146)



American Mastodon (Schuberth 1986, 147)

The generally cold and unsettled weather resulted from the presence of the ice sheet" that in the winter looked "like a huge, broad ramp covered...with a new coat of white snow." While the winters were much warmer than today, the summers were also much cooler than today. The weather was persistently cloudy and cool with abundant rain and occasional snow. During the summer, clouds of mosquitoes and black flies probably swarmed.

Very near the glacier, the climate was too harsh for any trees to grow. The barren landscape stretched for 50 miles in some places. South of the tundra-like zone, the sparse and scattered clumps of spruce and fir gradually turned into a continuous evergreen forest. The woolly mammoth roamed within walking distance of the ice front. The mammoth was a short-tailed and small-eared relative of the elephant with a woolly coat that made him well equipped for the rugged climate along the glacial front. The immense tusks of some of the older mammoths were used as snowplows to clear the snow cover from bushes so they could feed. Just beneath the skin was a layer of fat two or three inches thick that made it possible to survive the winter when food sources were snow-covered. The American Mastodon another mammoth-like animal browsed on the coniferous forests southwest of the glacier. The giant beaver that weighed about 500 pounds and the stag-moose with antlers that often measured 6 foot across also inhabited th forests.

Some people believe that the Clovis people (the first people known to have inhabited this great land) may have lived in the vicinity and hunted these gigantic animals. Spear points or other projectile points found near the fossilized bones of mastodons leads some experts to believe that the Clovis people may even have been partially responsible for the disappearance of many of those now extinct species.

(Schuberth 1986, 142-151)

## GROUP 5 INFORMATION SHEET

A letter from Lucinda Rutherford shortly after she settled in eastern \_.

"The prairies here are delightful, they are from 12 to 20 miles wide, and 150 miles long, instead of the timber surrounding them, they surround the timber, at this season they are most beautiful. The green grass has sprung up and covered the whole bosom of these wastes; with that grass there springs up a multitude of flowers of every hue, form, and scent. It is delightful to ride over this level land and every step, tramping those gems of nature underfoot. Their beautiful heads can be seen as far as the eye can reach waving in the summer wind."

To most, life on the \_\_\_\_\_ prairies was neither pleasant nor easy. The hordes of biting insects that lived on the prairie would alight on and nearly cover the bodies of horses and riders driving both into a mad frenzy....quite often there were no trees or other landmarks to guide the settlers across these vast plains.

On the prairie it was intensely hot during the summer months, and bitterly cold during the winter. Droughts caused crop failures and prairie fires destroyed wheat fields, which resulted in shortages of food during the winter months for some families. Other families did not arrive in time to plant and raise crops....a Sangamon County family near starvation was described rather graphically by Peter Cartright, a Methodist circuit rider, in the winter of 1845: "For many miles back I had not passed a solitary house, but right here was a little, old, smoky cabin, and a poor, dirty, ragged family, hovering and shivering over a small fire. The man, the head of the family, was gone out hunting. I was hungry, and asked for food; but the good woman informed me she could not give me anything to eat, for the best of reasons, they had nothing for themselves.

Tall grass prairie is a bittersweet thing. In deep winter when the long winds blow out of the northwest, the prairie world can be ... cold, hard, and cheerless... And then, suddenly, all that begins to change. ...The annual prairie miracle is underway... There is a rich, loamy sweetness to the air as the sun warms the deep prairie soils and life begins to emerge from winter hiding. A faint wash of green appears on the gray-dun prairie landscape and then, on some fine day in late April or early May, the first real splashes of floral pigments are added. From then until hard frost, there will be no time when the prairie is without flowers. In wave after wave of floral successions in indigo, pale lavender, crimson, gold, cream, white, and magenta-in every tone and hue of the artists' palette-the prairie flowers come on. For 6 months or more the rich and varied panorama will continue, changing from week to week, beginning with ground-hugging pasque flowers and birdsfoot violets and climaxing with towering suflowens. Many of their names are pure Americana: rattlesnake master, bundle flower, queen-of-the-prairie, shooting star, blazing star, alum root, blue-eyed grass, yellow star-grass, bell flower, windflower, ... butterfly milkweed, and button snakeroot. (Runkel and Roosa 1989, 36-42)



## GROUP 6 INFORMATION SHEET

In this region, there are a variety of cities and towns. Some of them, like the city on the lake in the northeastern part of the area, are heavily populated. The downtown area of this large city has a lot of very tall skyscrapers. As a matter of fact, when you are walking on the streets downtown, you sometimes feel as if you were in a forest made up of buildings. There are many expressways running into the large downtown area from the surrounding suburbs. These suburbs contain almost as many people as the city itself. At certain times of the day, there are so many cars on the expressways that traffic sometimes comes to a complete stop. The skyline at night as you drive into the city is beautiful with many of the tops of the downtown skyscrapers lit up with colorful lights.

There are many restaurants, theaters, shopping areas, businesses, and industries within the city and the suburbs. They are necessary to supply jobs, food, merchandise and recreation for the huge population that lives there. This city is built along a river and a lake and both the rich and the poor can enjoy the waterfront parks and beaches. A green belt of forest preserves where people can go to enjoy nature encircles the city.

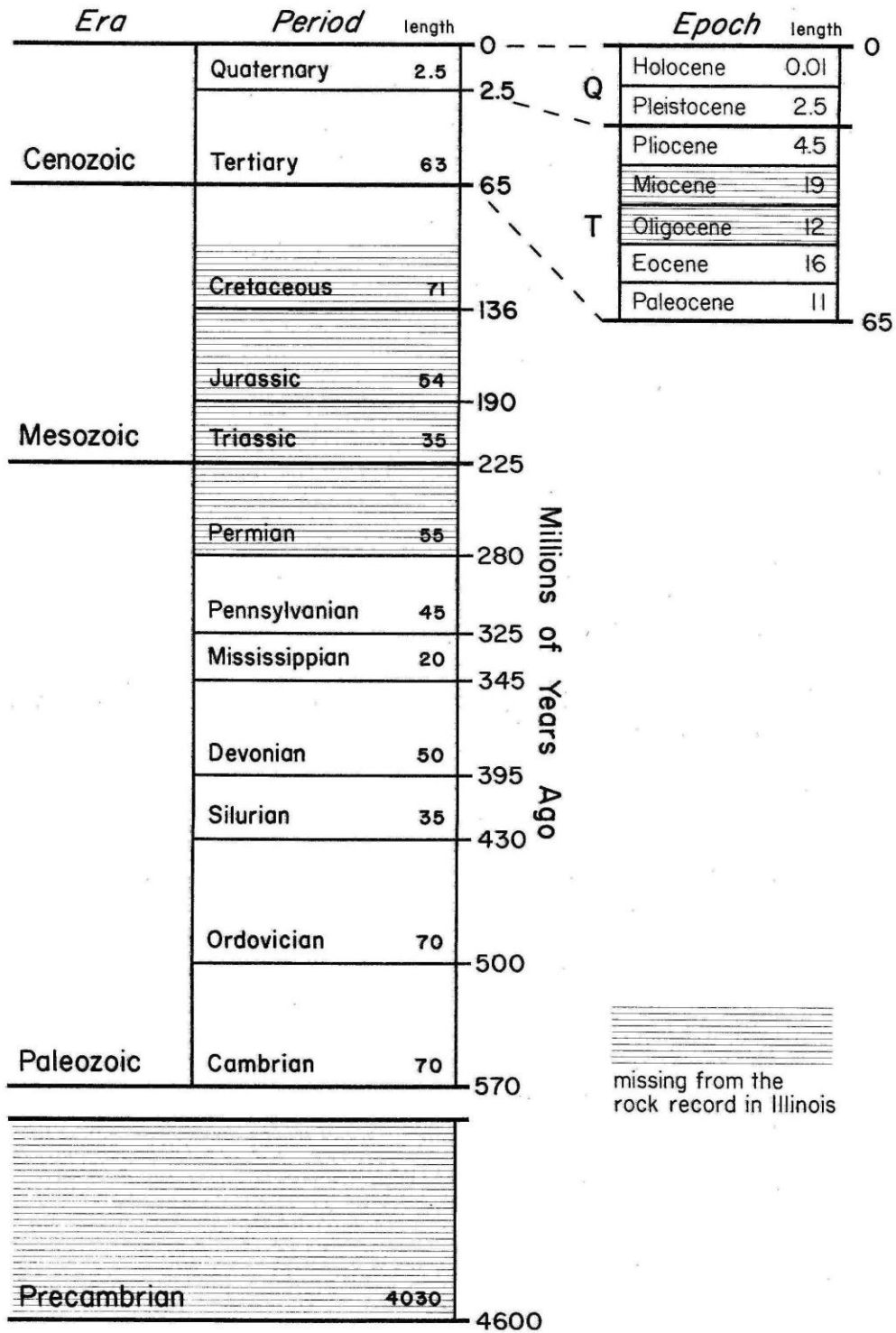
You can find all types of people living in this city. There are rich, middle-class and poor people. Many of them come from other countries and have moved to this city to make it their home. There are many different types of homes for people to live in. In some neighborhoods, people live in a house with their own yard; in others, people live in apartments. Many neighborhoods are a mixture of houses and apartments. Sometimes, the people are crowded together and the living conditions are very poor.

Other cities are spread out over the countryside. Some have large populations with a lot of industries and businesses. Some towns in this special region are rural and are much smaller. They are surrounded by small family owned farms and by larger farms operated by companies. In the summertime, the fields have crops. In the wintertime, these barren fields stretch for miles and are sometimes covered with snow.

There are many places for people in these small towns to go for recreation. The plentiful rivers and streams are busy places for recreational boaters and fishermen. There are parks with wooded areas for hiking and exploring. Other trails run along the site of an old Canal and rivers and are used for biking and hiking.

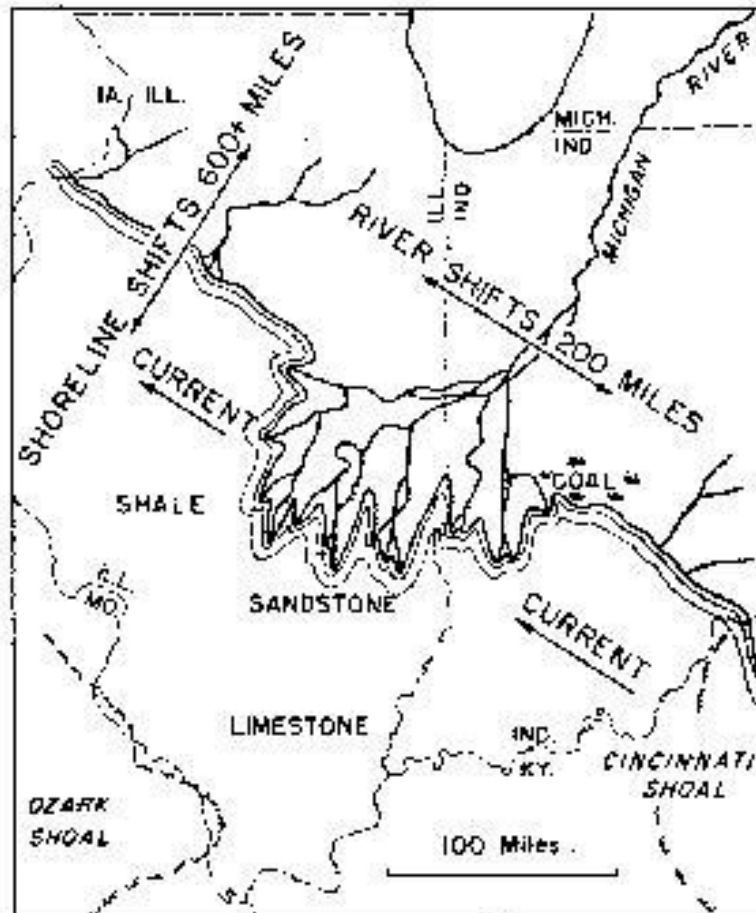
The waterways have historically been a major transportation route. Barges use the river to move coal, chemicals, and grain to markets. Canals connect waterways. Locks and dams built on the major rivers help barges maneuver up and down its length. These water highways have been responsible for the birth and growth of cities, large and small, along their banks.

# A.1: Geologic Time Scale



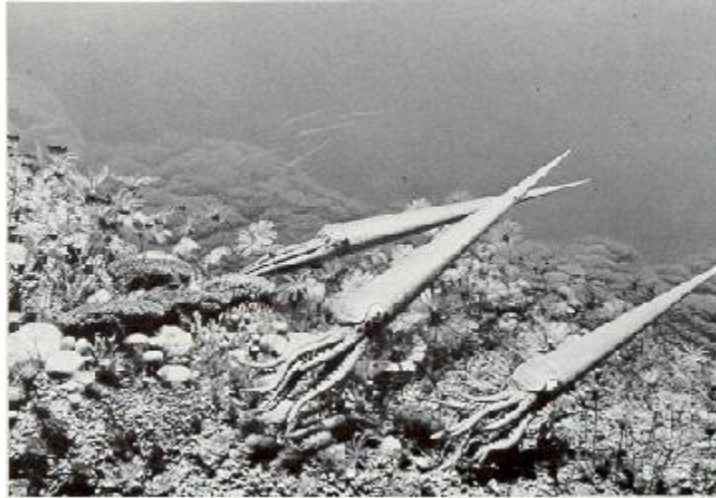
The geologic time scale for North America showing the approximate age and duration of each era, period, and epoch. The ages are in millions of years. Periods and epochs missing in Illinois are shaded. (Schuberth 1986, 69)

## A.2: Paleo Geography of Illinois-Indiana Region



Paleogeographic map of the Illinois-Indiana region during Pennsylvanian time. The Michigan River was building a delta into the shallow sea to the south. While sand, silt, and lime were accumulating in the sea, coastal swamp forests flourished on the adjacent lands. The plant debris that accumulated as thick mats of peat eventually turned into bituminous coal. (Map courtesy of Illinois State Geological Survey) (Schuberth 1986, 87)

### A.3: Time of Tropical Seas



This coral reef flourished in the Silurian sea and is reconstructed on the basis of fossil evidence. Corals, such as the large, rounded reef-building tabulates, were especially common. so, too, were the flower-shaped, filter feeding crinoids and trilobites try to escape from the taper-shaped, tentacle-bearing nautiloid cephalopods that were the primary predators oon the reef. As in moder coral reefs, the organisms living during Silurian time were bright and colorful. (Photograph courtesy of Milwaukee Public Museum) (Schuberth 1986, 54)