**FINAL REPORT**

**TO THE ILLINOIS WILDLIFE PRESERVATION FUND**

**FOR THE PRODUCTION OF**

***CHANGES INSTITUTE FIELD GUIDES***

**CONTRACT #RCO6-LW09W**

**FROM THE ILLINOIS STATE MUSEUM SOCIETY**

**PROJECT DIRECTOR: DR. BONNIE STYLES**

**AUGUST 7, 2006**

## Introduction

The Illinois State Museum's new natural history hall, *Changes: Dynamic Illinois Environments*, engages visitors in free-choice learning about Illinois environments, wildlife, and the forces of environmental change. It engenders a better understanding of important environmental issues and conservation of natural resources. The exhibition is playing a major role in environmental education for teachers, students, and the general public and will do so for years to come. Over 250,000 people visit the Museum each year. Many of the visitors to the exhibition are families and students, many of whom know little about Illinois' diverse wildlife or conservation issues. Museum staff members are in the process of developing new educator-led school programs and will launch a teacher training program in the fall. Many visitors do not participate in an educator-led program. To enhance the educational value of the *Changes* exhibition for these visitors, the Museum developed a series of field guides ("*Changes* Checklist*s"*) to the wildlife depicted in dioramas throughout the exhibition.

The "*Changes* Checklists" provide an engaging activity for unguided visits to the exhibition, and include a checklist of species encountered that the visitor can complete. To emphasize the forces of environmental change, the field guides carry visitors through Illinois' varied landscapes from the marine and tropical forest environments of "Tropical Illinois," to the glacial-forest tundra of "Frozen Illinois," and the varied landscapes of the "Current Interglacial" from the Lake Michigan shoreline to the Cache River swamps. "Changes checklists" were developed for (1) insects, (2) spiders and other arthropods, (3) shelled animals, (4) fish, (5) reptiles and amphibians, (6) two checklists for birds, and (7) mammals. The eight checklists provide illustrations, information on habitat requirements and status for the selected species, and challenges for visitors that require that they find the animal in the exhibits and review exhibition labels to answer questions.

Families and other visitors select a field guide of their choice, use it to provide an additional challenge for their visit, and retain it for future use—indoors or outside. They can select a different field guide checklist on their next visit to provide a unique orientation for each visit.

## Methods and Materials

The Illinois Wildlife Preservation Fund provided supported for an educator (Sue Huitt) for six months to coordinate and develop the content for the checklists. The Museum's project director Dr. Bonnie Styles, seven Museum scientists (Dr. Jeffrey Saunders, Dr. Jessica Theodor, Dr. Tim Cashatt, Dr. Eric Grimm, Dr. Hong Qian, Dr. Robert Warren, and Dave Bohlen), and two educators (Beth Shea and Nina Walthall) worked with the Educator hired through the project to select the species to be depicted in the checklists, develop the content on habitat preferences and status for selected species, and the questions for visitors to answer. The Museum's Exhibit Design Chief, Joe Hennessy, the designer of the *Changes* exhibition, developed the template for the checklists to incorporate design elements and graphics from the physical exhibition. The Project Educator assimilated initial drafts for the checklists. The Project Educator and whole project team reviewed and edited the draft checklists. The Museum's Chairperson of Education, Beth Shea, and Museum Educator Nina Walthall edited and tested the draft checklists for grade level, interest, and efficacy with visitors. The reading level for the checklists is the same as that for the *Changes* exhibition (fifth grade through adult). The checklists were revised based on the suggestions and findings of the Museum and project educators. The Museum's Exhibit Design Chief completed the final layout and design for the checklists. The project team completed another round of editing before the checklists were finalized. The Museum staff members worked at no cost to the project and contributed their time as match for grants from the Illinois Wildlife Preservation Fund and the Institute of Museum and Library Services, which supported some of the preliminary planning for family activities. The Illinois State Museum and Illinois State Museum Society provided the equipment and commodities used during the development phase. The checklists are being printed on demand for distribution to visitors using Museum printers.

## Discussion and Summary

The Project Educator hired under the auspices of this grant, working with Museum staff, produced eight "*Changes* Checklists." The checklists are provided to unguided family and other social groups who visit the Museum's new natural history hall, *Changes: Dynamic Illinois Environments.* The checklists provide graphic images of animals in the *Changes* exhibition dioramas, information on the species, and challenges for visitors that require that the visitor find the animal in the exhibits and actually review information presented in the exhibition labels to answer questions. One checklist each was developed for insects, spiders and other arthropods, shelled animals, fish, reptiles and amphibians, and mammals, and two checklists were developed for birds. Copies of the

"*Changes* checklists" are attached to this report as hard copies and provided as a pdf on the enclosed CD, along with a second CD that includes the report text.

The eight "*Changes* Checklists" created for this project:

- increase visitor engagement with the Museum's new natural history hall,
- increase visitor interest in and understanding of Illinois's wildlife,
- increase visitor understanding of important environmental and conservation issues as related to wildlife, and
- encourage stewardship of habitat and wildlife.

The checklists encourage multi-generational learning within families and other social units. Older members of groups interpret the materials for the younger members, including young children. The checklists strengthen and reinforce the educational value of the *Changes* exhibition.

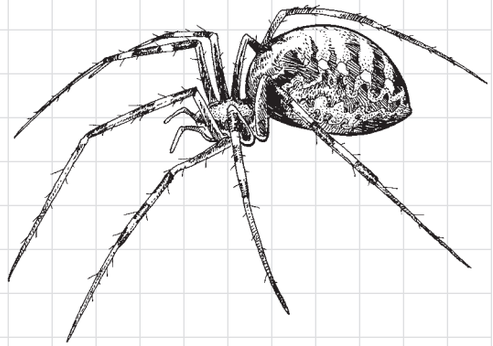
**Project Expenditures**

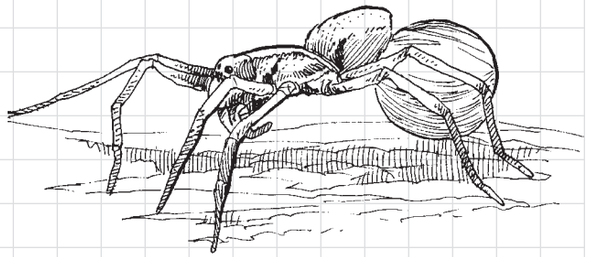
All grant funds were expended for salary and related fringe ($22,045) for the Project Educator (Sue Huitt) and indirect costs at 13.26% of requested dollars ($2,923) as per the original request and as designated in the grant award. The Illinois State Museum Society provided all paper commodities, color ink cartridges for the printer, and other commodities in excess of the declared $1000 match; and well in excess of the declared $5,000 match for production, layout, and printing.

## Cave Orbweaver Spider

This brown and tan spider traps small insects in its web on cave walls and ceilings. It weaves an 'orb' web - one that is woven in a circle.

Draw this spider's web.





## Wolf Spider

This large, dark brown spider hunts insects and other prey in open areas. It sometimes burrows in sandy areas.

Where did you find it? _____

Where do wolf spiders live after they hatch from eggs? _____

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Funding for the Changes Checklist provided by Institute of Museum and Library Services

Illinois Wildlife Preservation Fund

# Changes

Check off the animals you find, and answer the questions.

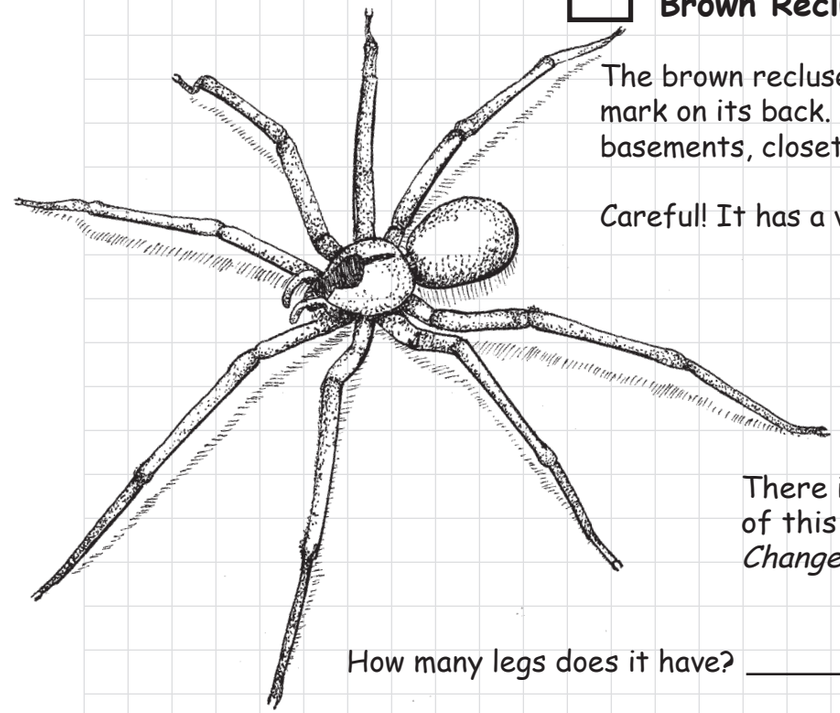
_____

Checklist

## Spiders

and other arthropods

## Brown Recluse Spider



The brown recluse has a violin-shaped mark on its back. It sometimes lives in basements, closets, and drawers.

Careful! It has a venomous bite.

There is a large model of this spider in the *Changes* exhibit.

How many legs does it have? _____

How many legs do insects have? _____

Arthropods are animals with a hard outer shell (exoskeleton), a body of two or more segments, and jointed legs. There are many kinds of arthropods, including trilobites, scorpions, millipedes, spiders, and insects.

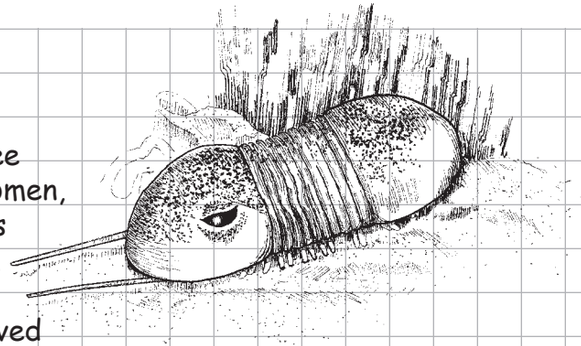
## Trilobite

Trilobites are named for the three lobes of their bodies - head, abdomen, and tail. They lived in shallow seas hundreds of millions of years ago.

How do we know trilobites once lived in Illinois? _____

_____

_____



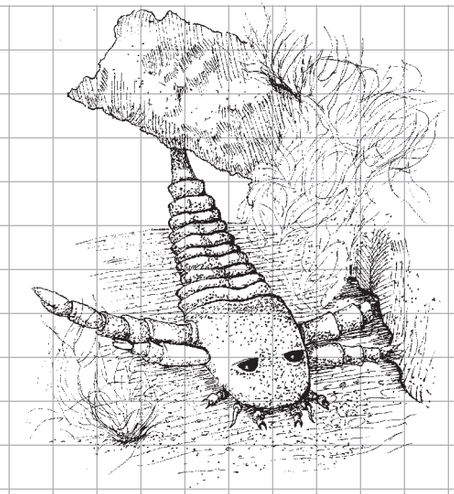
There were many species of trilobites. This one is *Bumastes nigrensis.*

## Eurypterid

Eurypterids, called sea scorpions, were ancient aquatic animals. The two small front legs have pincers. This species of *Adelophthalmus* is small. There is a model of it in the case with the Mazon Creek fossils.

Where did you see a bigger eurypterid in the *Changes* exhibit? _____

_____

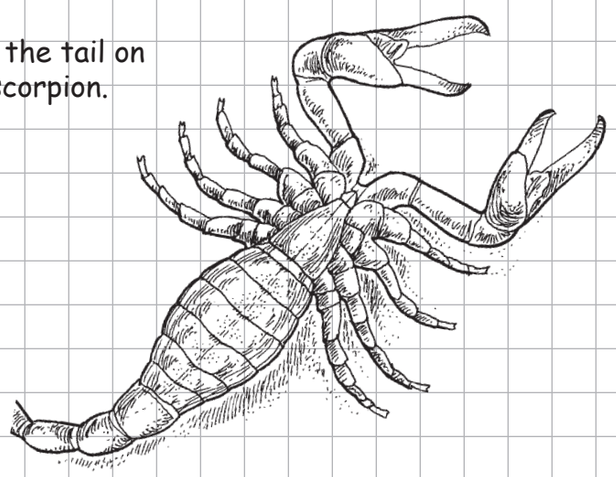


## Scorpion

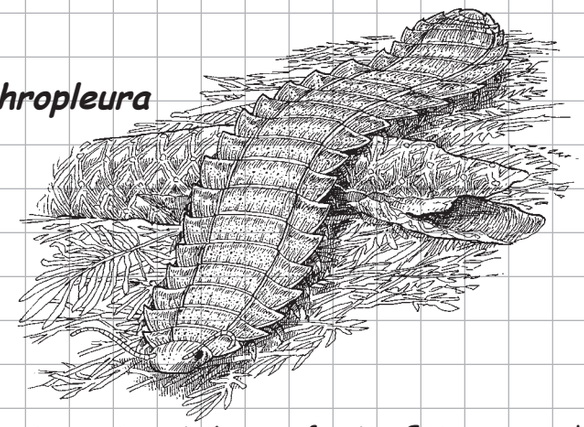
Scorpions first appear in the fossil record about 440 million years ago. This one, *Labriscorpio alliedensis* is very small.

Where did you find a group of scorpions? _____

Draw the tail on this scorpion.



## *Arthropleura*



This extinct creature is known for its flat, armored body segments. Some of these animals were <u>seven</u> feet long, with as many as <u>30 pairs</u> of legs. Fossils have been found of tracks they made through ancient forests.

When did *Arthropleura* live? _____

Which modern-day animal looks like a much smaller *Arthropleura.* (circle the answer)

Snake Eel Millipede

## Virile Crayfish

This blue and pink crayfish is found in rocky streams and lakes. It can dig burrows but usually lives under flat stones.

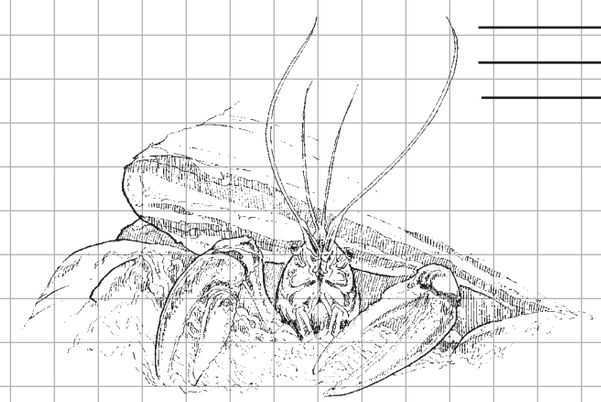
Where did you find one? _____

Name some animals that might eat this animal.

_____

_____

_____



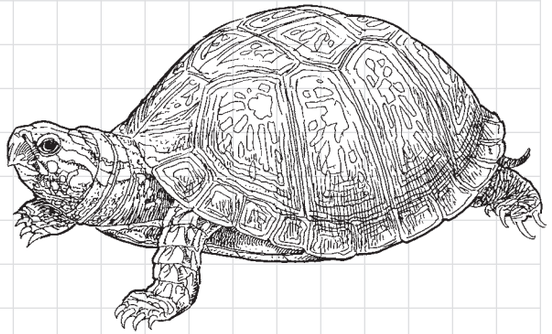
## Eastern Box Turtle

This land turtle lives in forests in the southern half of Illinois. When predators threaten, it can pull in its head, legs, and tail and close up like a "box."

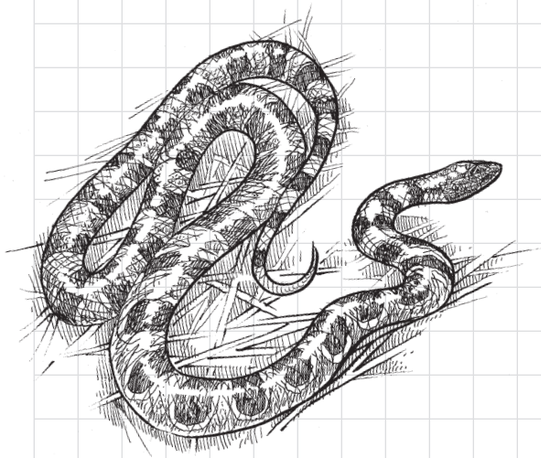
What does it eat? _____

_____

Can a box turtle live for over a hundred years? _____



## Prairie Kingsnake



This large, gray snake has dark spots on its back and sides. It lives in prairies, open woodlands, and farm fields in the southern half of Illinois.

Is it harmless to humans? _____

How does it help humans? _____

_____

_____

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Illinois Wildlife Preservation Fund

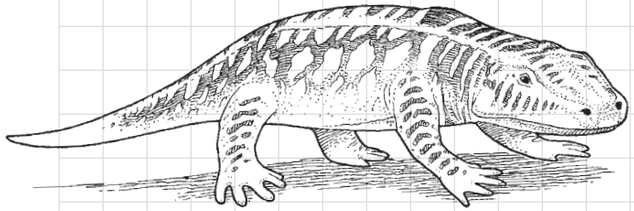
# Changes

Check off the animals you find, and answer the questions.

_____

Checklist

# Reptiles & Amphibians



Where did you find a model of *Megalocephalus*?

_____

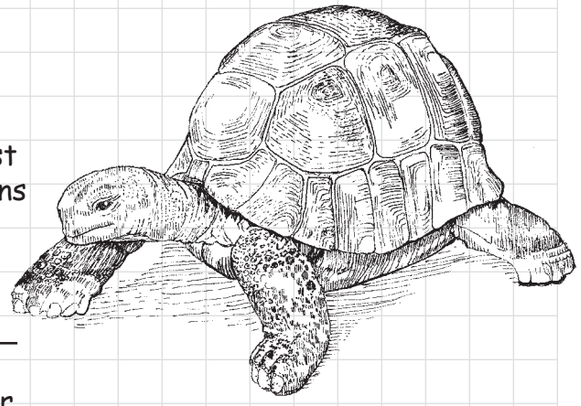
Where did these animals lay their eggs? _____

_____

## *Megalocephalus*

*Megalocephalus* (which means big head) was an early type of amphibian that lived about 320 million years ago. Amphibians were large, and reptiles were small during this period.

## Giant Tortoise



This extinct land-dwelling reptile was a plant eater. Today its closest relatives live in dry, tropical regions with no winter frosts.

When did giant tortoises live in Illinois? _____

Do you think Illinois was warmer or colder then than it is now? _____

## Painted Turtle

This aquatic turtle lives in ponds, lakes, and streams throughout Illinois. It eats insects, mollusks, and dead fish.

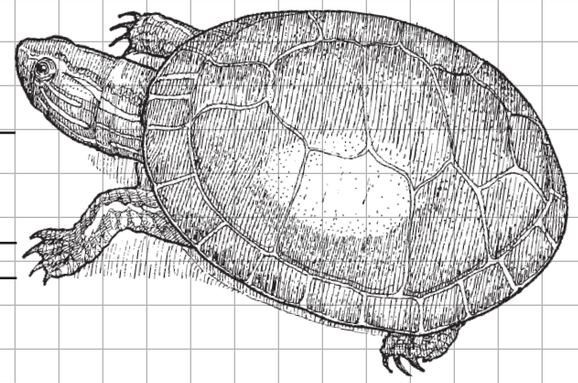
Where did you find it? _____

What do you see here that it could eat?

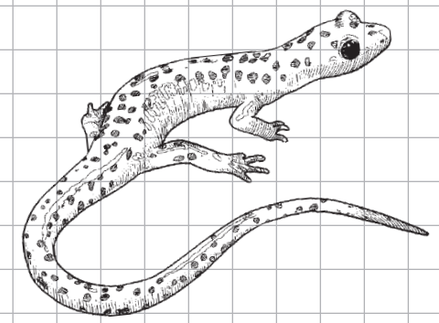
_____

_____

What color are the stripes on its head and neck? _____



## Cave Salamander



This amphibian lives in caves, springs, and cypress swamps. It is nocturnal. It sleeps during the day and comes out to hunt at night.

Does it live in northern or southern Illinois? _____

What does it eat? _____

_____

## Cottonmouth

This aquatic snake has dark markings. It lives in warm, wet areas such as swamps. Its venomous bite kills small animals quickly, but it is rarely fatal to humans.

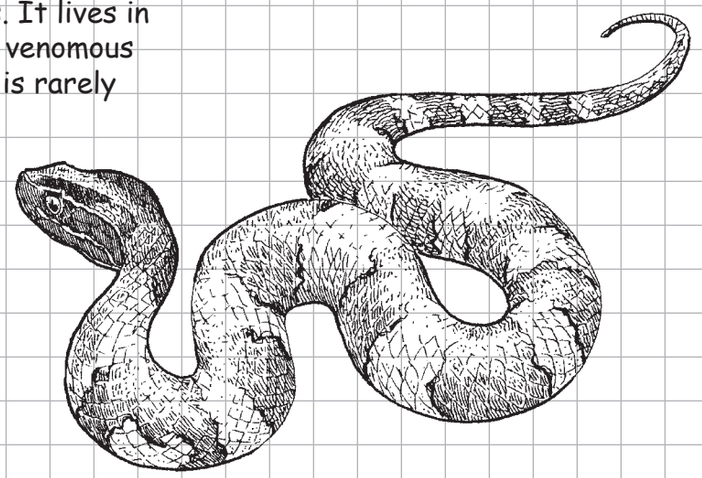
It has a heat-sensing pit near its nostrils. How might this help it hunt? _____

_____

How did it gets its name?

_____

_____

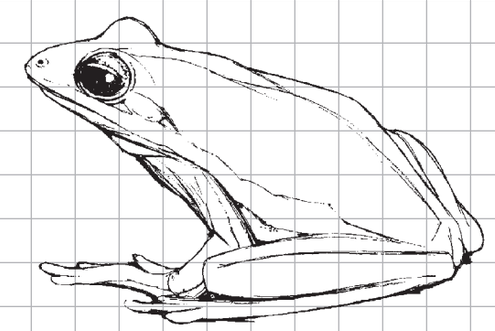


## Green Treefrog

This small green frog lives in swamps. During the day it sits quietly on leaves or tree trunks. It hunts for insects at night.

Where did you find one? _____

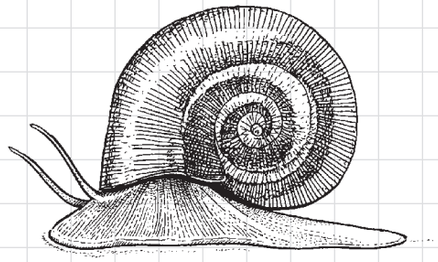
Does its green color help it survive? _____



Reptiles and amphibians are cold blooded. Reptiles have scaly skin and can survive on land away from water. Amphibians have smooth skin. They spend at least part of their life cycle in water.

## Marsh Ramshorn

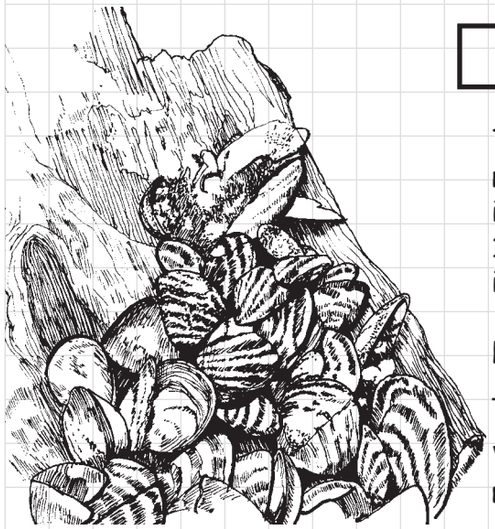
This freshwater snail lives in lakes and ponds. It uses its antennae to help find food. Its shell is coiled like the horn of a ram.



How does it breathe? _____

_____

Did you find it in still or flowing water? _____



## Zebra Mussel

These small freshwater mussels are native to Europe. They were accidentally introduced to North America in the 1980s and now live in lakes and streams in Illinois.

How are they a problem? _____

_____

Why do you think they are called zebra mussels? _____

Many species in Illinois were introduced from other parts of the world. They compete with native species for food and habitat.

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# Changes

Check off the animals you find, and answer the questions.

_____

Checklist

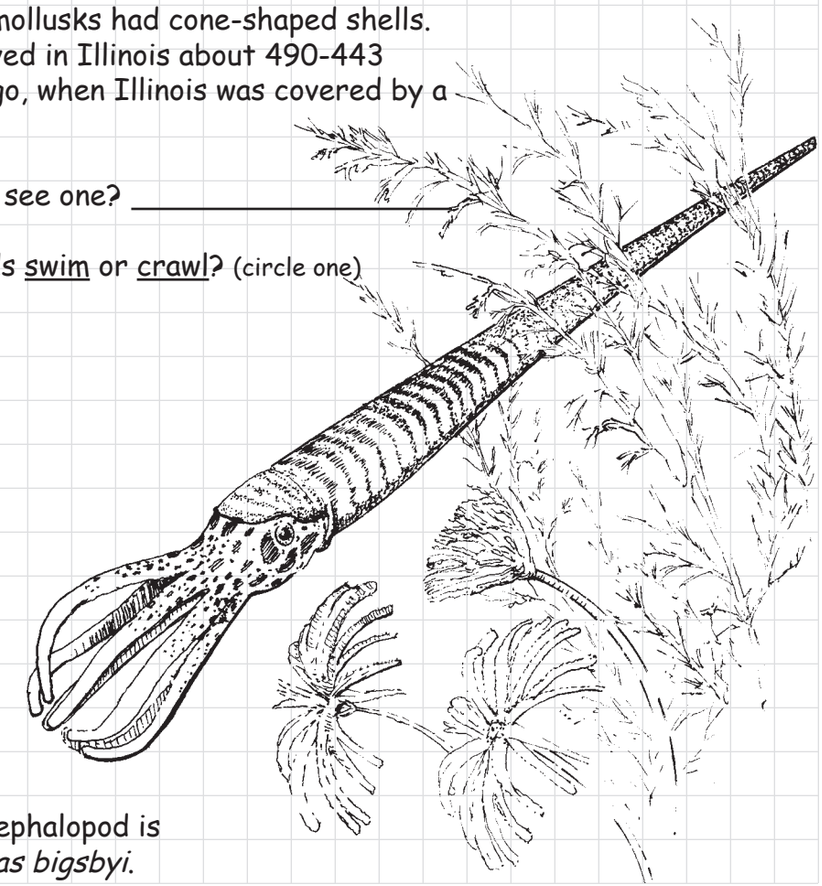
# Shelled Animals

## Straight Cephalopod

These marine mollusks had cone-shaped shells. This species lived in Illinois about 490-443 million years ago, when Illinois was covered by a shallow sea.

Where did you see one? _____

Did cephalopods swim or crawl? (circle one)



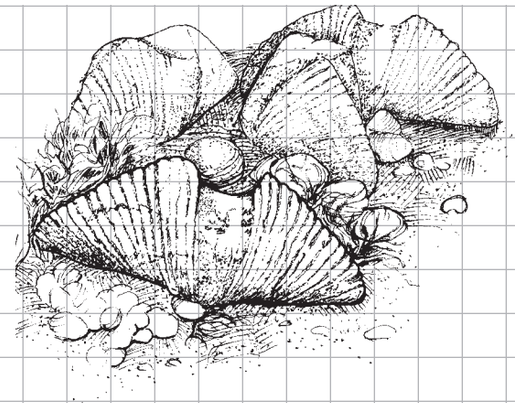
This species of cephalopod is named *Actinoceras bigsbyi*.

## Brachiopod

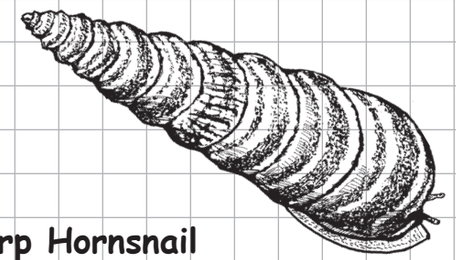
This brachiopod species lived in Illinois seas about 340 million years ago. They ate microscopic animals by filtering them out of seawater inside the shell.

What animal are they closely related to, clams or bryozoans? (circle one)

Brachiopods live in modern oceans. Do they live in Illinois today? _____



This species of brachiopod is named *Syringothyrus texta.*



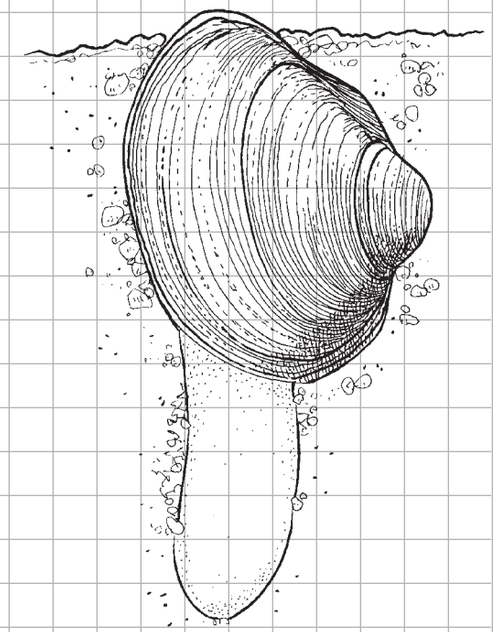
## Sharp Hornsnail

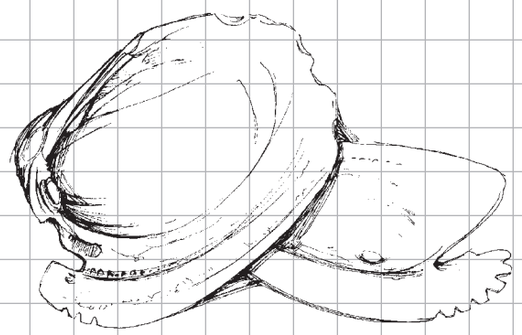
This freshwater snail lives in rivers. It is named after its horn-shaped shell.

Circle the snail's antennae.

In what river did you find it?

_____



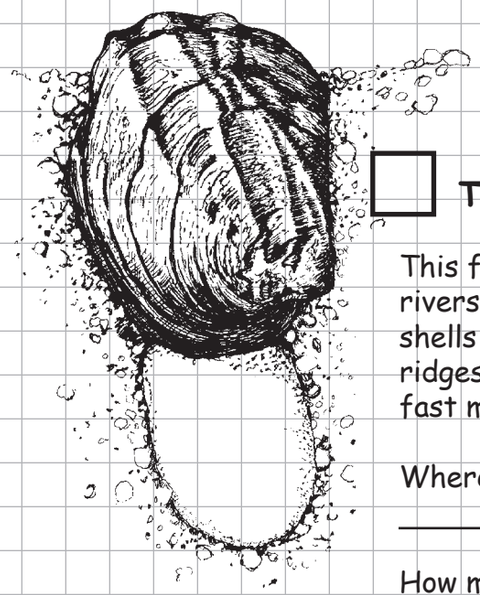


## Plain Pocketbook Mussel

This freshwater mussel lives in rivers. The drawing shows the inside of the shell halves. American Indians used its shells to make spoons and other tools.

What color is the shell? _____

Pollution eliminated this species from the Illinois River by 1930. Do you think it lives anywhere in the river today? _____



## Threeridge Mussel

This freshwater mussel lives in rivers. Some mussels have smooth shells but this one has ridges. The ridges help anchor the mussel in fast moving water.

Where did you find it?

_____

How many ridges does it have on its shell? _____

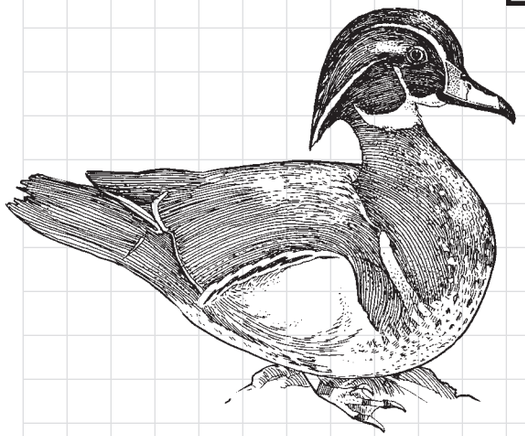
## Giant Floater

This freshwater mussel lives at the bottom of backwater lakes. It burrows down into the mud.

What is its foot used for? _____

_____

Does its shell feel smooth or bumpy?
(circle one)



## ☐ Wood Duck

Wood ducks nest in holes in trees at the water's edge and feed in shallow water. You can find this species in two of the *Changes* dioramas.

Did you find them? _____

Who has the most colorful feathers, the male or the female? _____

Would cutting down floodplain forests help or hurt this species? _____

## ☐ Wild Turkey

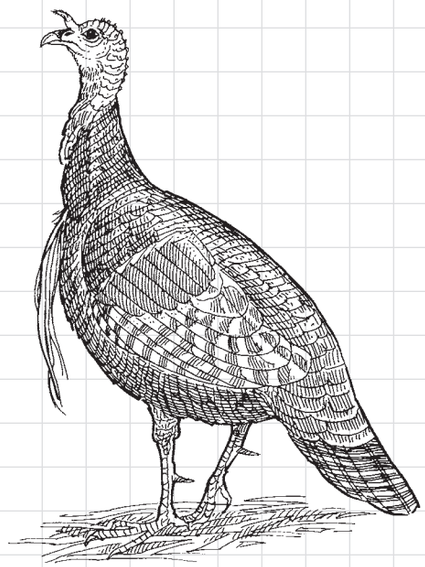
These large birds need both forests and open areas to eat and raise their young.

Where do they build their nests?

_____

Where do they roost at night?

_____



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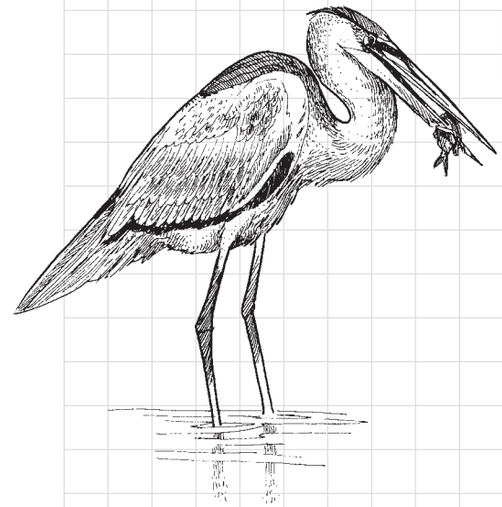
# Changes

Check off the animals you find, and answer the questions.

_____

☑ Checklist

# Let's Go Birding!



## ☐ Great Blue Heron

This long-legged wading bird is one of the largest birds in Illinois.

In what habitat did you find this bird?

_____

It uses its long beak to catch _____ and _____ ?

## ☐ Carolina Parakeet

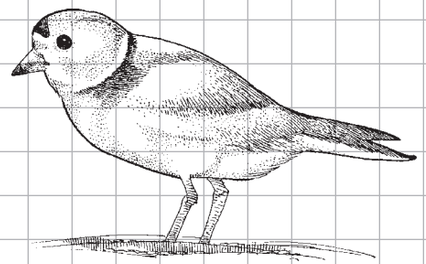
These colorful wild parakeets lived along streams, swamps, and in forests. People hunted them to extinction because they ate their crops.

Where did you find a flock of Carolina parakeets? _____

Name the colors you see on the Carolina parakeet. _____

_____

## Piping Plover

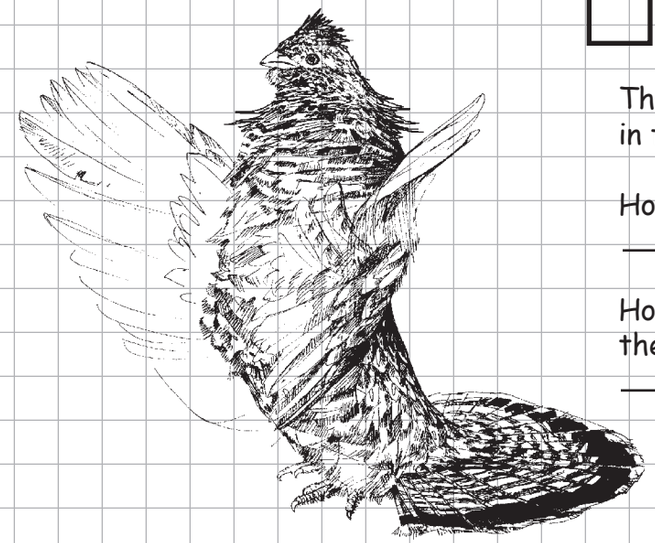


This small wading bird is endangered in Illinois. It nests in dunes and walks easily on beach sand. It eats worms, insects, and little shelled animals.

Where does it build its nest? _____

What does it mean to say a species is endangered? (circle the answer)

It's dangerous to humans. It's in danger of going extinct.

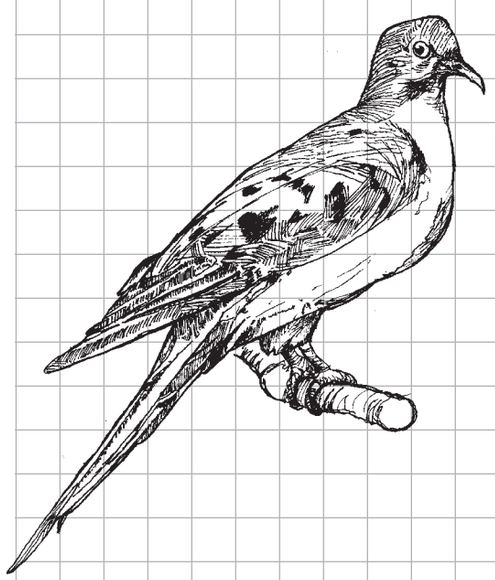


## Ruffed Grouse

These ground-dwelling chicken-like birds live in the forests of northern Illinois.

How many ruffed grouse can you find? _____

How do the colors of their feathers protect them? _____



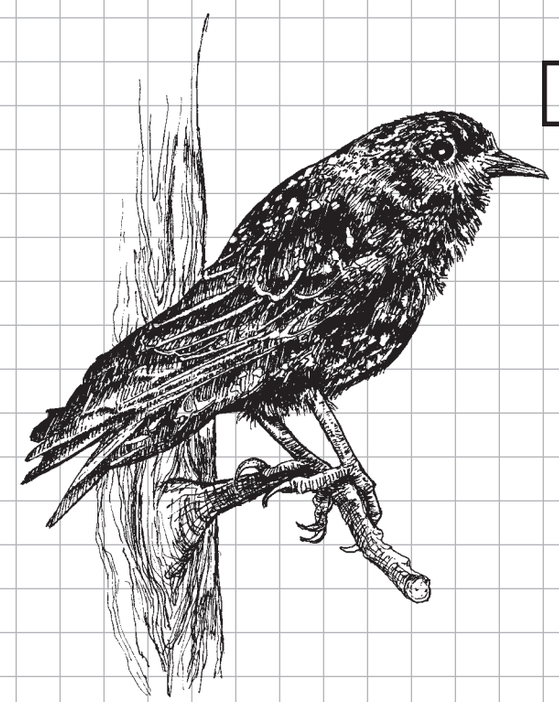
## Passenger Pigeon

These wild pigeons lived in forests. They once numbered more than 4 million. Today they are extinct. The last one died in a zoo in 1914.

Where did you find a flock of passenger pigeons? _____

What happened to these birds? _____

Can you find living passenger pigeons today? _____



## European Starling

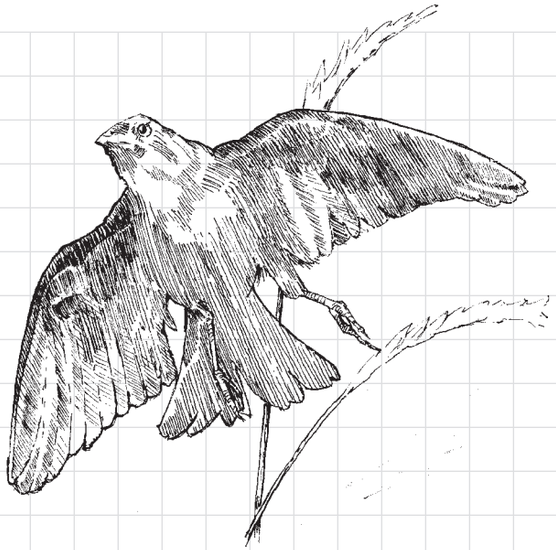
This dark-feathered, short-tailed bird is an invasive species. Invasive species compete with native birds for nesting places and food.

Where did it come from? _____

When did it arrive in the U.S.? _____

Name one other bird it competes with for habitat. _____

## Brown-headed Cowbird



This prairie bird gets it name because it follows herd animals and has brown feathers on its head.

Where do they lay their eggs? _____

_____

Why does this cause problems for other birds? _____

_____

## Greater Prairie Chicken

Prairie chickens are related to domestic chickens. Once common throughout the state, today they live in only one area of southern Illinois. Their breeding ground is protected.

Do they nest in trees or in the grass?

_____

Today the prairie chicken is: (circle the answer)

Endangered  Threatened  Extinct

Why? _____

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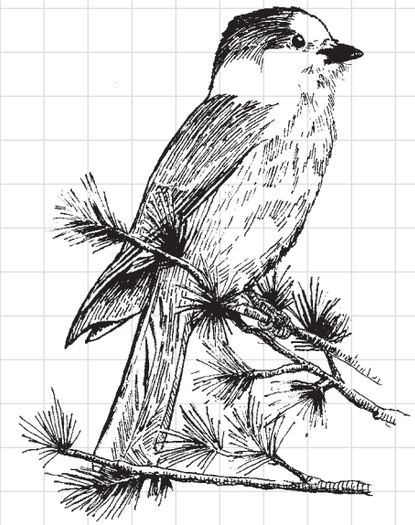
# Changes

Check off the animals you find, and answer the questions.

_____

Checklist

# Let's Go Birding Again!



## Gray Jay

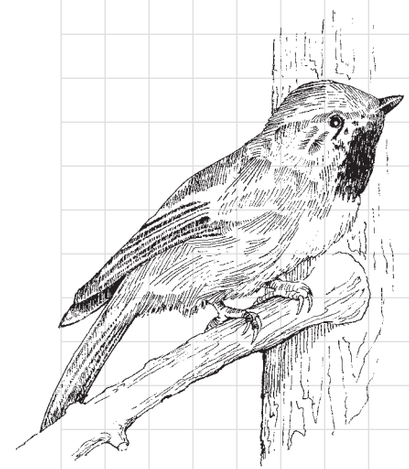
This large gray jay now lives in cold northern forests.

Where did you find it? _____

Was it colder or warmer when the bird lived in Illinois? _____

What colors are its feathers?

_____ and _____



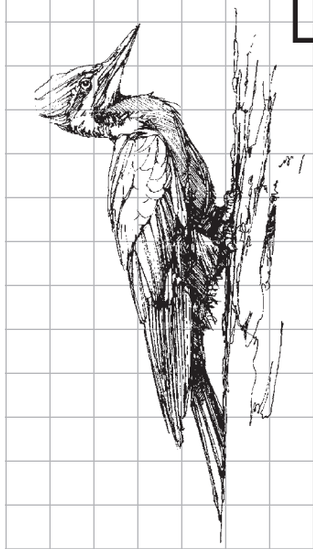
## Boreal Chickadee

This small bird with a small beak has a brown cap and black bib. Today it lives in boreal (northern) forests in Canada, northern Minnesota, and Michigan.

Where did you find this bird? _____

Why do you think they no longer live in Illinois?

_____



## Pileated Woodpecker

This large forest bird has red feathers on the crest of its head.

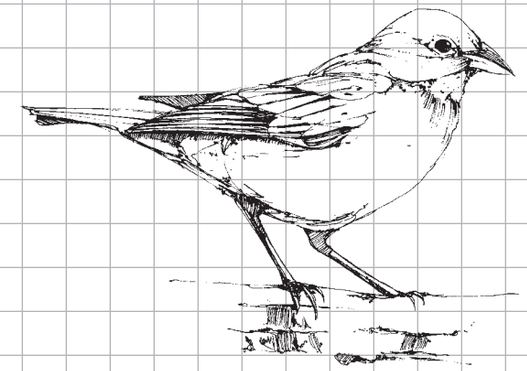
Why does this bird drill holes in tree bark?

_____

_____

Do pileated woodpeckers live in Illinois today?

_____



## Indigo Bunting

This small songbird navigates by the North Star during its migration from South America. The male looks blue in sunlight.

Where did you find one? _____

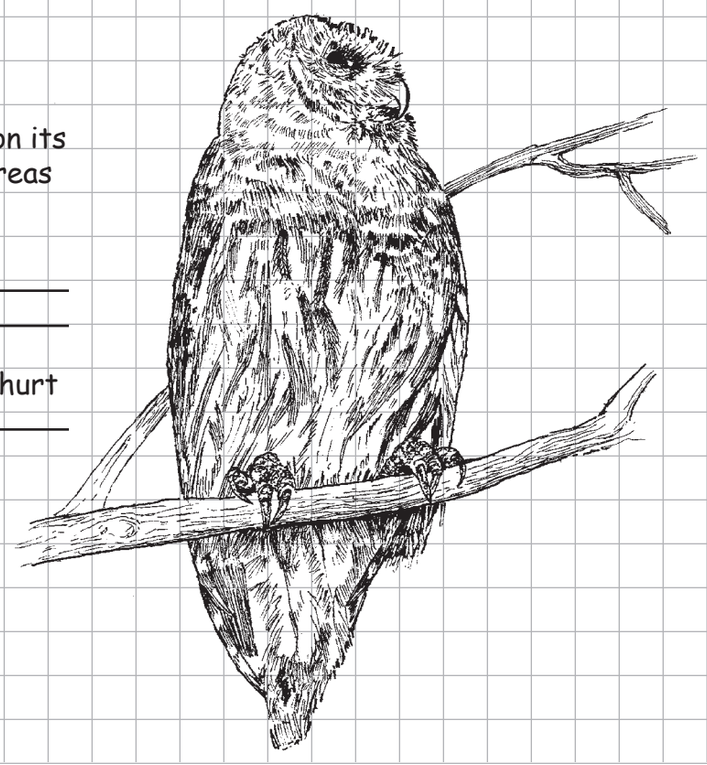
## Barred Owl

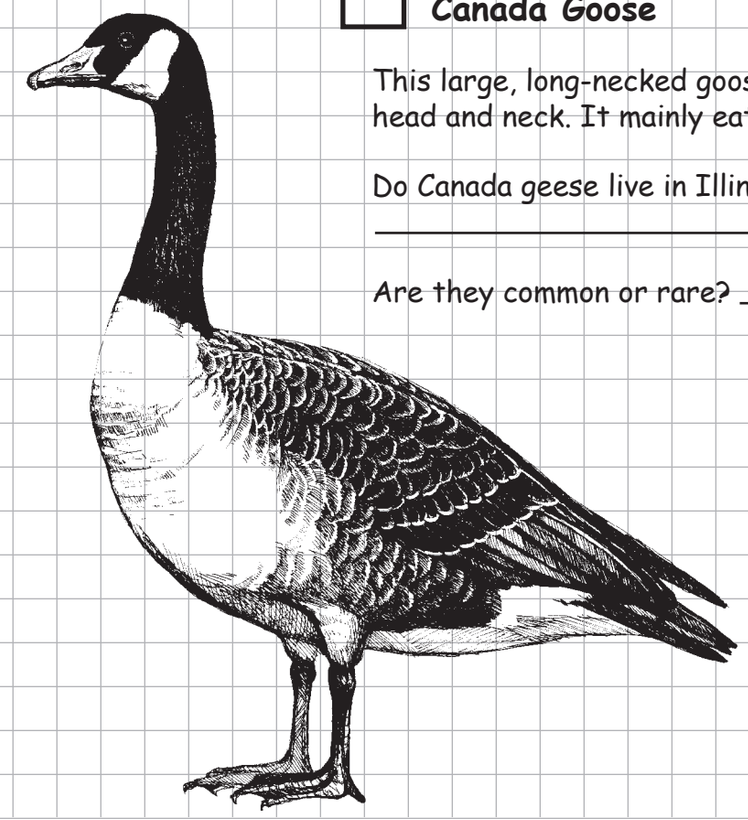
This large owl has gray-brown bars on its chest and belly. It lives in wooded areas and hunts at night.

What does it eat? _____

_____

Would cutting down forests help or hurt this species? _____





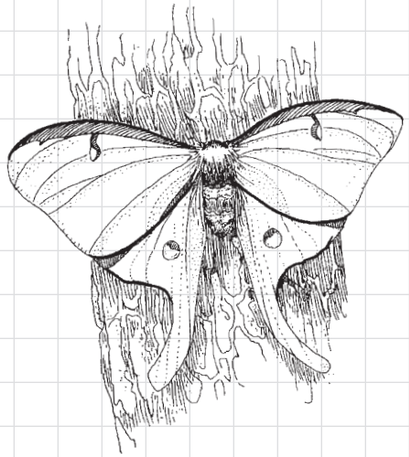
## Canada Goose

This large, long-necked goose has a black head and neck. It mainly eats plants.

Do Canada geese live in Illinois today?

_____

Are they common or rare? _____



## ☐ Luna Moth

This large, green moth lives in hardwood forests. The caterpillar feeds on leaves of shade trees, such as hickory, cherry, and willow.

What is it resting on in our exhibit?

_____

How long does a luna moth live?

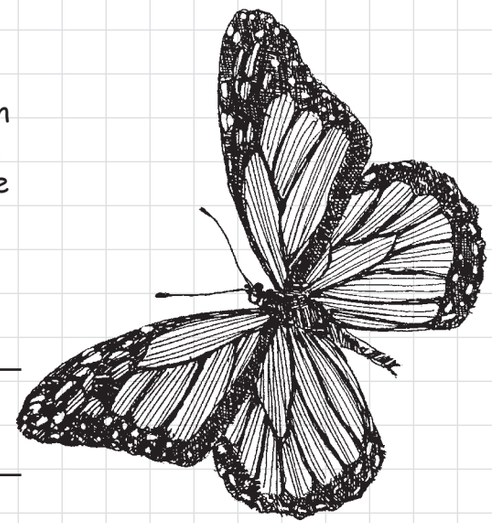
_____

## ☐ Monarch Butterfly

This orange and black butterfly lives in open fields and forest edges. Monarch butterfly larvae feed on milkweed. The butterflies fly south in the fall. The monarch is the Illinois State Insect.

What happens to birds that eat this insect? _____

How many butterflies can you find in this habitat? _____



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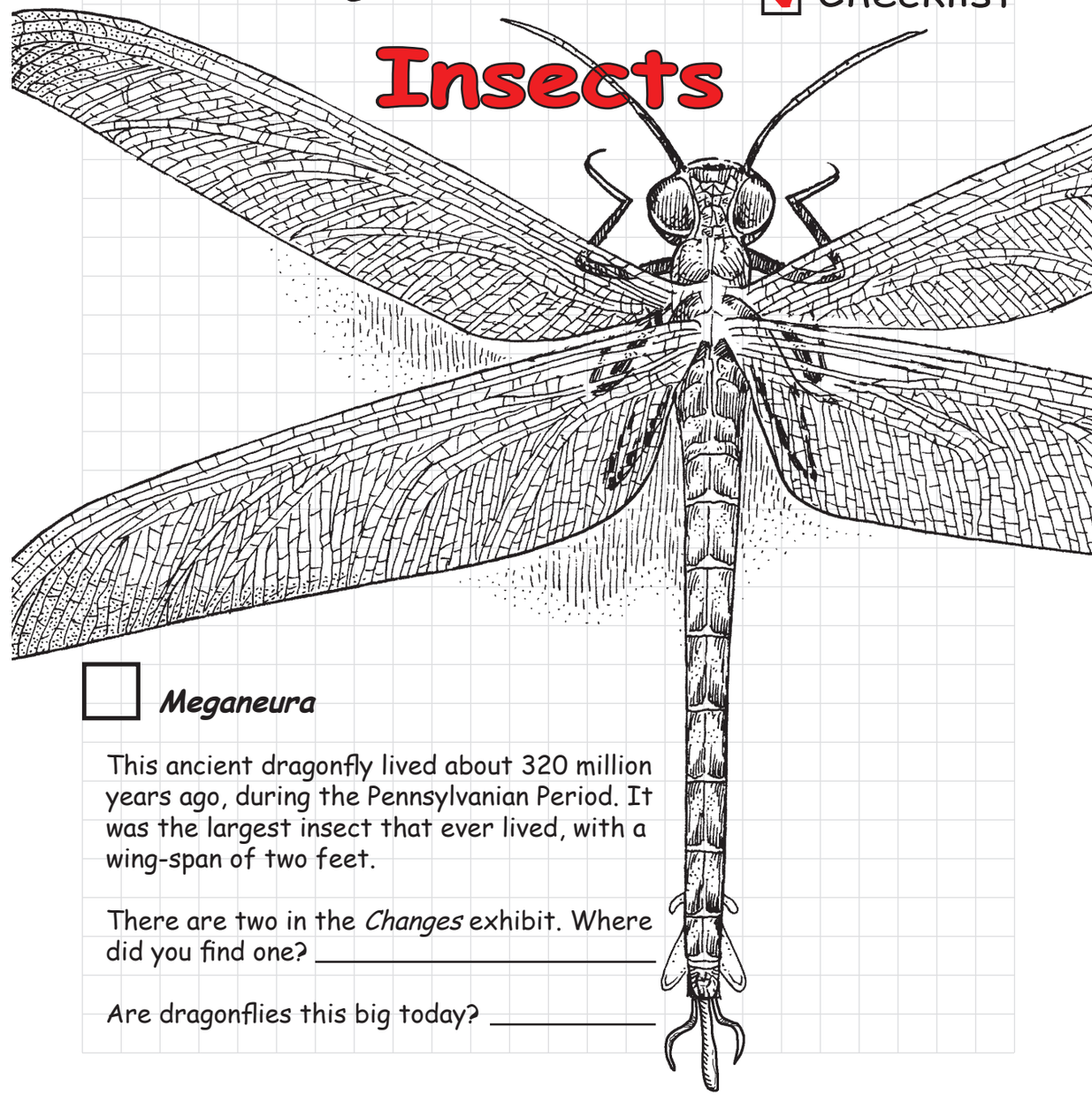
Check off the animals you find, and answer the questions.

_____

☑ Checklist

# Insects

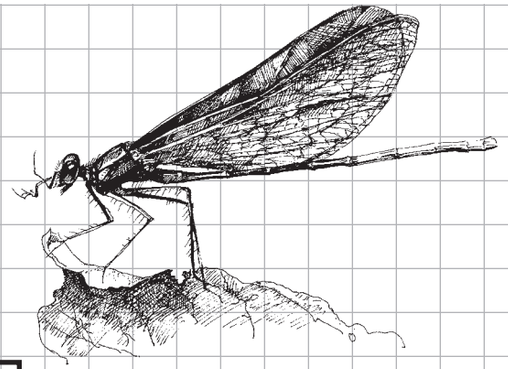


## ☐ *Meganeura*

This ancient dragonfly lived about 320 million years ago, during the Pennsylvanian Period. It was the largest insect that ever lived, with a wing-span of two feet.

There are two in the *Changes* exhibit. Where did you find one? _____

Are dragonflies this big today? _____



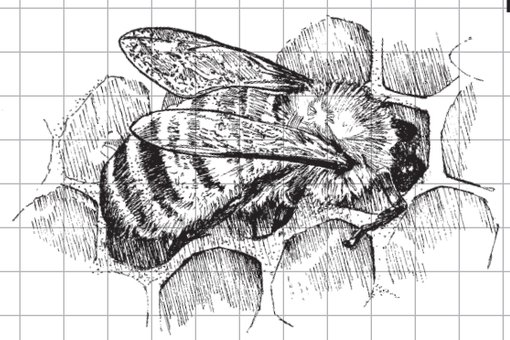
## Ebony Jewelwing

This damselfly flies along the edges of backwater lakes and woodland streams. It catches and feeds on smaller insects. Its head and wings are black, and its body is shiny green.

Where did you find it? _____

Do damselflies perch with wings held upright or flat? _____

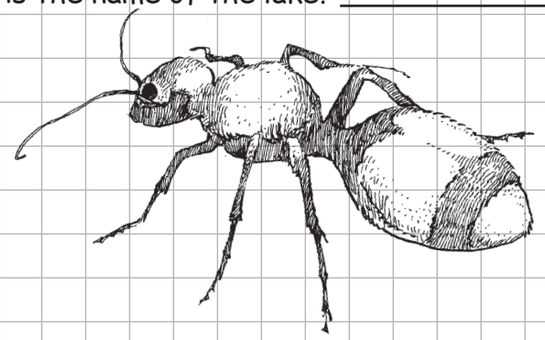
_____



## Velvetant

This large, brightly-colored wasp looks like an ant. It lives in sandy habitats. It stings and paralyzes the larvae of other bees and wasps to feed its young.

You can find some in an exhibit with a large lake. What is the name of the lake? _____



Can this wasp fly? _____

How do you know? _____

## Honey Bee

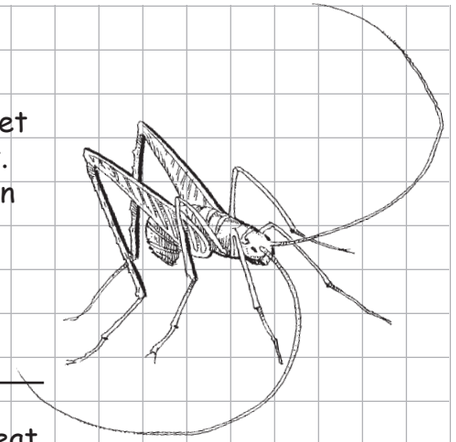
The honey bee is an introduced species, but it is also an important pollinator for food crops.

How does it help people? _____

_____

Name two other introduced insects in the exhibit. _____

## Camel Cricket



The camel cricket or cave cricket is a tan-colored, wingless insect. It has an arched back. It lives in dark humid places and is mostly nocturnal.

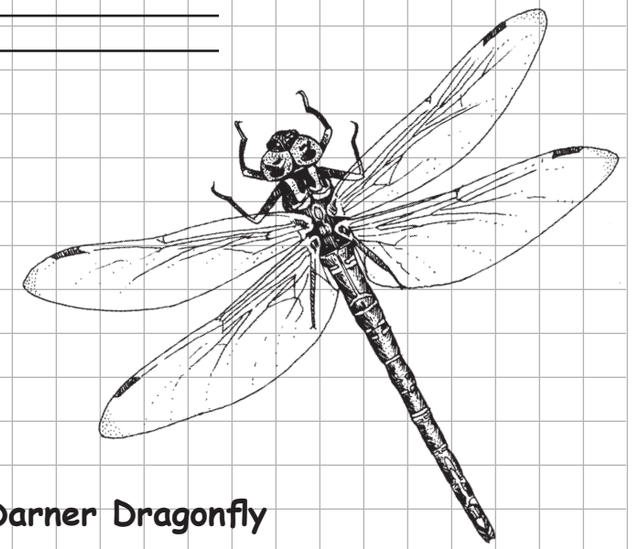
Does it feed during the day?

_____

Name some animals that might eat the camel cricket. _____

_____

_____



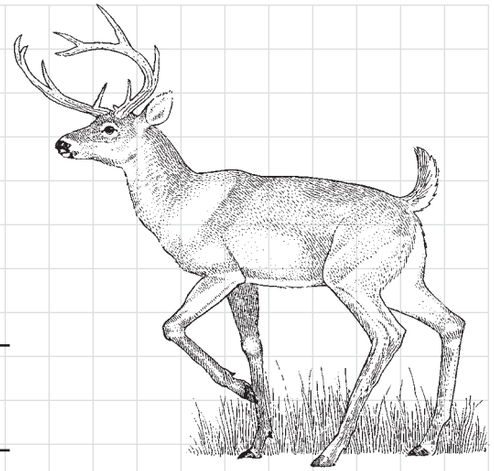
## Swamp Darner Dragonfly

This large brown dragonfly with green markings lives near swamps and slow-moving water. It feeds on insects.

Where did you find it? _____

Is it perched or in flight? _____

## White-tailed Deer



This browsing mammal was over-hunted and had to be restocked in Illinois in the 1930s. It is common in Illinois today. It is the Illinois State Mammal.

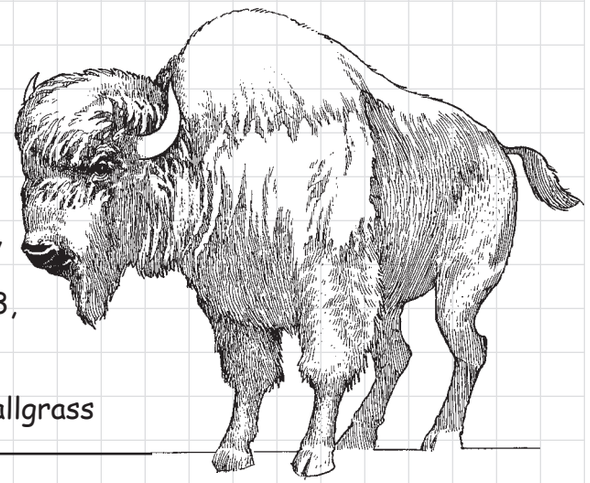
In which habitat did you find the deer?

_____

What kinds of plants are the deer eating? _____

_____

## Bison



Bison are "wild cattle" with long, brown fur. The bison exhibit shows the Illinois prairie in 1673, before Europeans settled here.

What happened to the bison's tallgrass prairie habitat ? _____

_____

Name some ways bison were used by Illinois Indians. _____

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# Changes

Check off the animals you find, and answer the questions.

_____

Checklist

# Mammals

## Harlan's Muskox

This muskox species had longer legs than the modern muskox. Both males and females had horns. The male also had a large bony mass across the middle of its head.

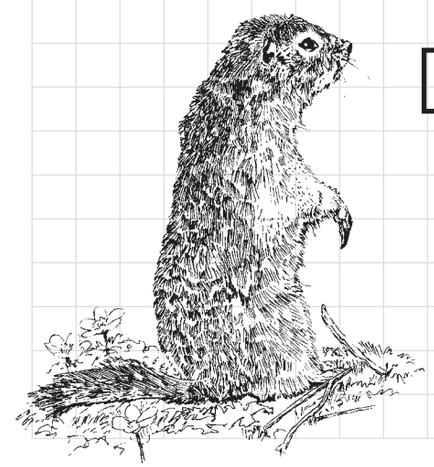
Where did you find this arctic mammal?

_____

Is the muskox in the exhibit a male or female?

_____

Do Harlan's muskox live anywhere today? _____

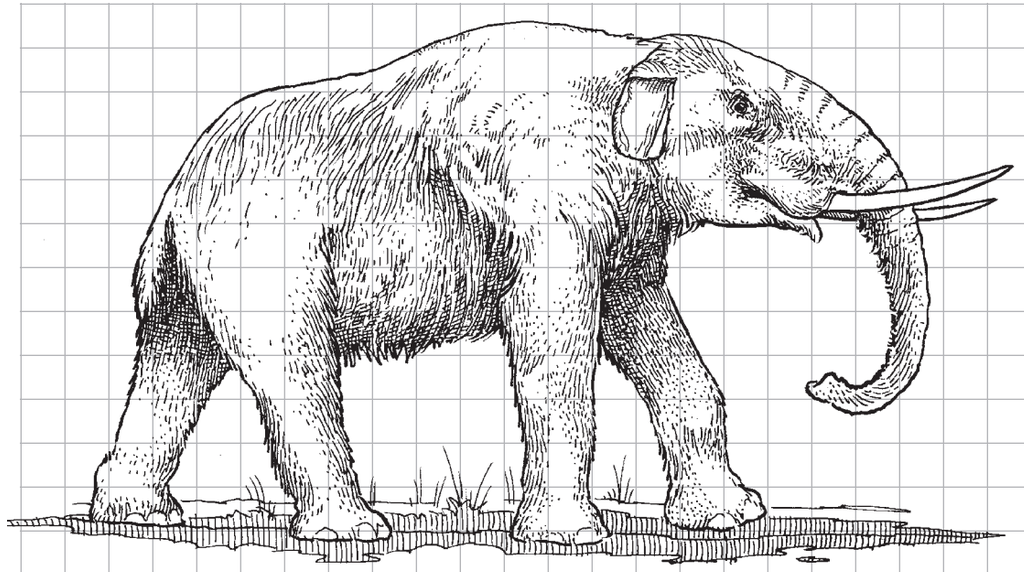


## Arctic Ground Squirrel

Illinois was cold when this ground squirrel lived here.

This squirrel does not live in Illinois today. Why not? _____

_____



## American Mastodont

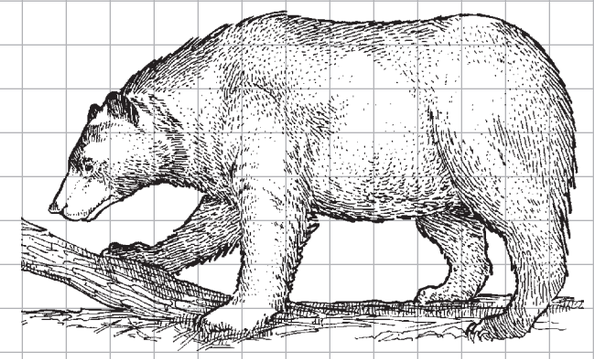
The mastodont was a large elephant-like animal. It was common in Illinois during the "Ice Age." Both males and females had tusks. They lived in spruce forests and ate plants.

Where did you find a mastodont skeleton?

_____

What happened to the mastodont at the end of the Ice Age? _____

At the end of the Ice Age, some animals went extinct. Some moved to other areas, and some adapted to the warmer climate and still live in Illinois today.



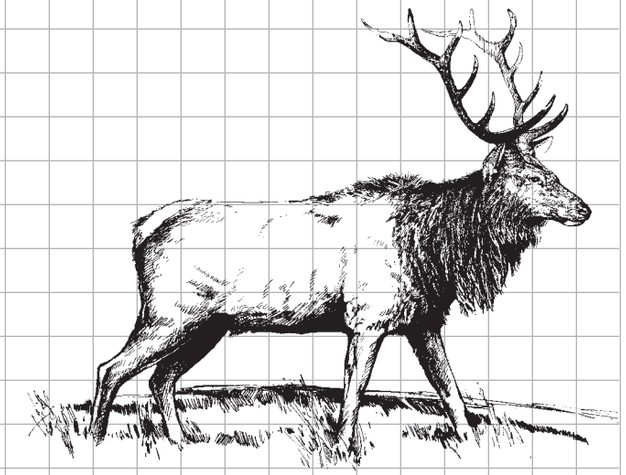
## Black Bear

This large mammal has black fur and large teeth. It lives in forests, but comes out in the open to hunt for food.

Do black bears live in the wild in Illinois today? _____

What happened to the forests where the bears lived? _____

_____



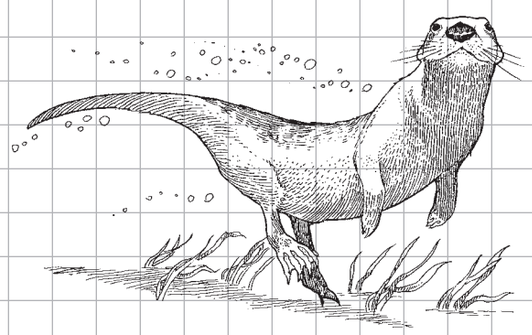
## Wapiti

Also known as elk, this large relative of the deer lived in Illinois for thousands of years.

What happened to its habitat?_____

_____

Are wapiti (elk) bones smaller or larger than white-tailed deer bones? _____

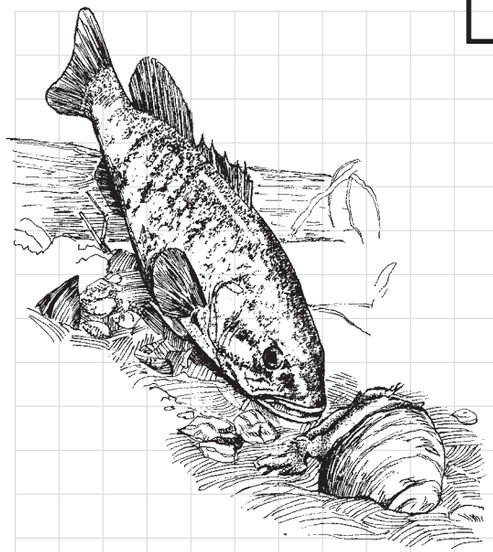


## River Otter

These sleek animals are great swimmers. Otters eat fish, mussels, reptiles, birds, turtles, frogs, and insects. There are river otters in two exhibits.

Where did you find one? _____

What animal is it chasing? _____



☐ **Smallmouth Bass**

This fish has a smaller mouth than the largemouth bass. It lives in clear, flowing rivers with gravel bottoms.

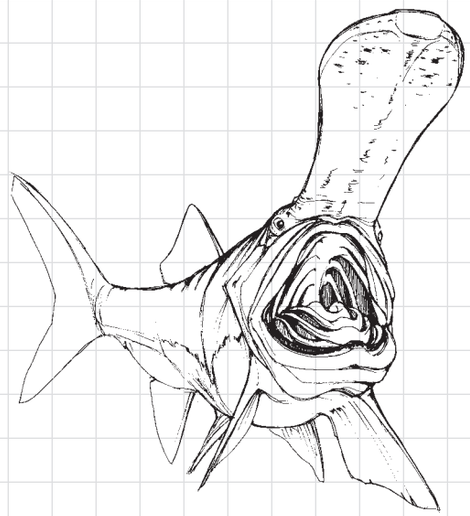
What animal is attracting the bass?

_____

How will water pollution hurt this fish?

_____

_____



☐ **Paddlefish**

Paddlefish have long snouts and smooth gray skin. They live in large rivers. This fish swims with its mouth open so it can catch tiny plants and animals to eat.

How did it get its name? _____

_____

Where did you find one? _____

_____

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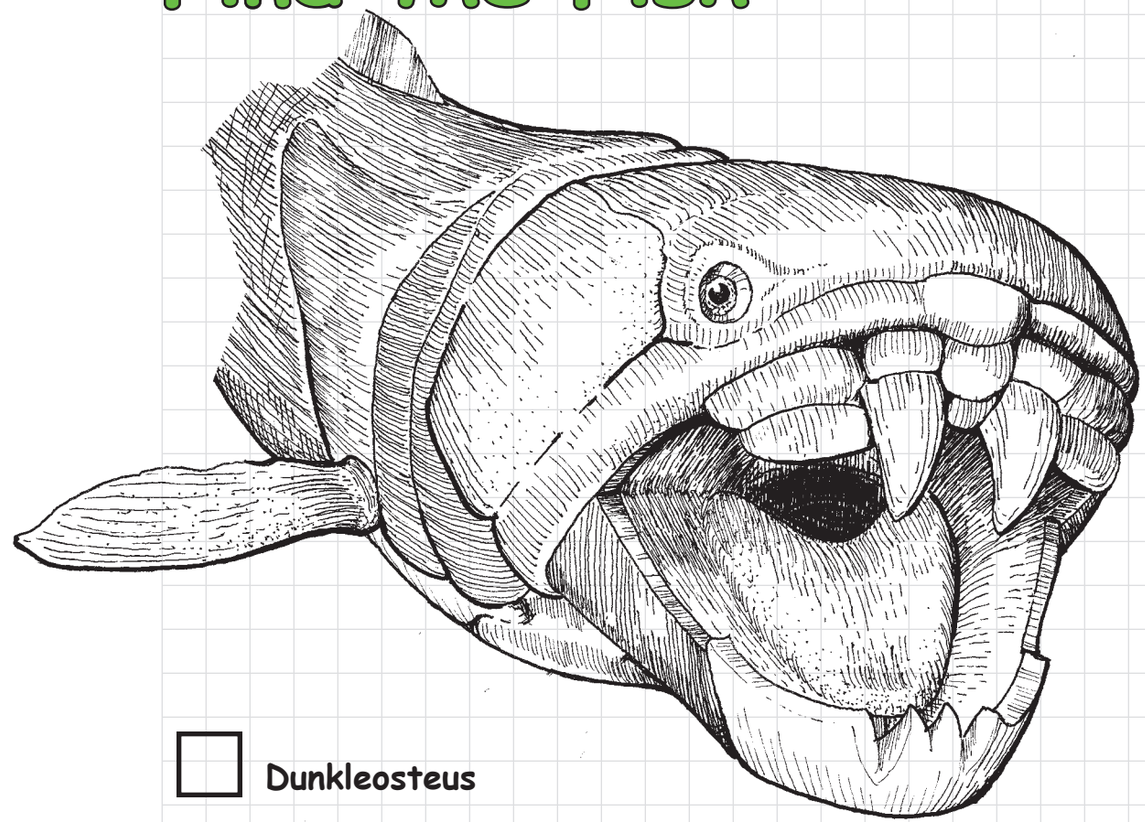
Check off the animals you find, and answer the questions.

_____

✓ Checklist

## Find the Fish

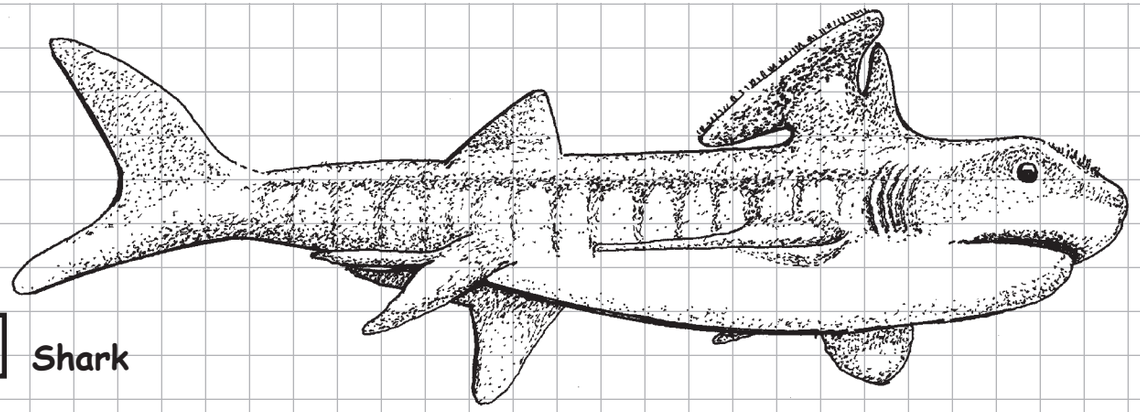


☐ **Dunkleosteus**

This primitive jawed fish had armored head and chest shields. It grew to a very large size.

Where did you find Dunkleosteus? _____

What is it trying to catch? _____

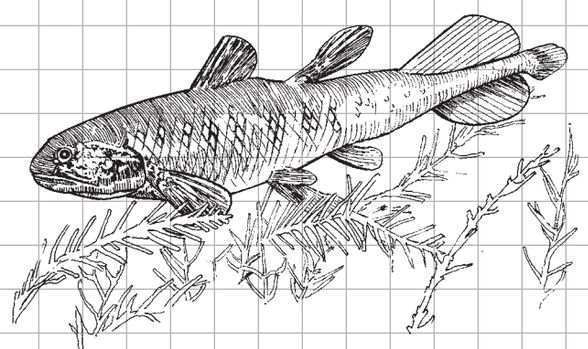


## Shark

*Stethacanthus* was an ancient shark genus. It had a brush-like structure on top of its head. Scientists are not totally sure of its purpose.

Where did you find the shark? _____

What did it eat? _____

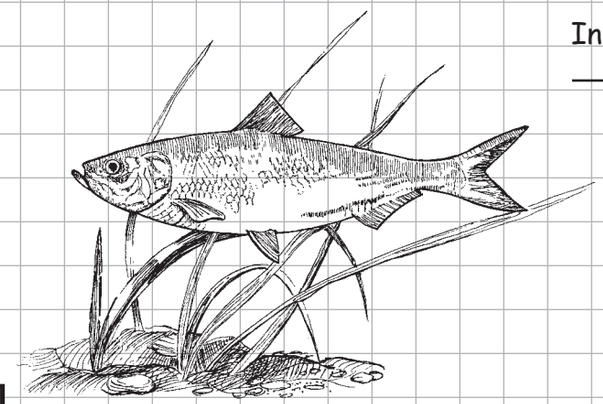


## Coelacanth

This ancient group of fishes had fleshy, foot-like fins. Scientists thought they were extinct, but in 1938 a coelacanth was caught in the Indian Ocean. Since then, many have been caught or seen.

Name a shark in the same exhibit. _____

_____



## Skipjack Herring

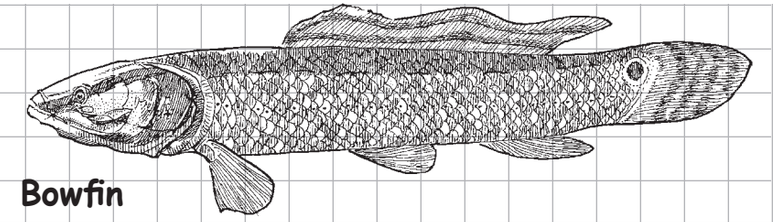
These small, streamlined fish live in clear, fast-flowing water. They migrate up and down rivers to reproduce.

What animal is chasing this fish?

_____

How would building dams on the river affect this fish? _____

_____



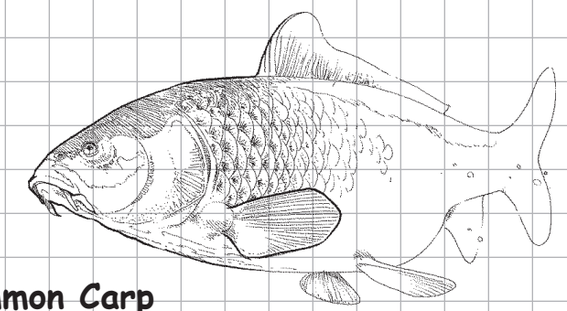
## Bowfin

The bowfin lives in shallow, clear pools of water filled with plants. It has a long fin on its back and a black spot near its tail.

Would draining lakes help or hurt this species? _____

In what way? _____

_____



## Common Carp

This large minnow is common to all types of water. Four barbels extend from its mouth. You can find this fish in several exhibits.

Is it a native species or did people bring it to Illinois? _____

Name two other carp species that have been brought to Illinois. _____

_____