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ON THE COVER

Three-Toed Box Turtle by Jim Rathert

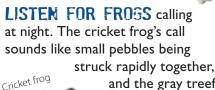
FUN THINGS TO DO AND GREAT PLACES TO DISCOVER NATURE

LIGHTNING BUGS

appear in May. Watch for them flickering over yards, parks, and fields on warm evenings.



FLOAT AN **OZARK STREAM** and try black bass fishing. The season opens May 27.



and the gray treefrog's call is a high-pitched trill.



Gooseberries, raspberries, and mulberries ripen in June.



919 SOME FROSS.

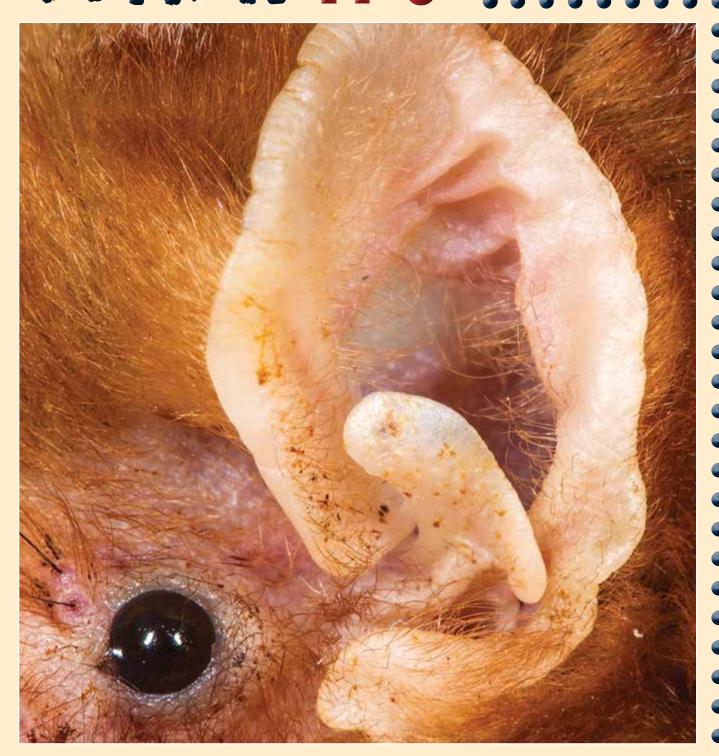
Bullfrog and green frog season opens at sunset on June 30.

WATCH THE BIRDS. Nesting season is at its peak, so lots of birds are carrying food to their babies. Enjoy the show from a distance. Curious people can disturb nesting birds.



WHATIS?

DON'T KNOW?Jump to Page 20 to find out.



......

- 1 By day, I hang like a leaf in a tree.
- 2 At night, I take flight on a hunting spree.
- 3 I send special sounds out into the air.
- 4 Then aim for my prey when the echoes I hear.

Into the line with the second second

Steep, rocky river bluffs are a harsh place to call home. But many plants and animals do. So next time you're canoeing a stream or bicycling the Katy Trail, don't forget to look up.

Take a Closer Looks

Cliff swallows stick globs of mud to the sides of bluffs to build their volcano-shaped nests. Some bluffs have hundreds of nests packed together in one spot. If you look at the nests through binoculars, you might see a swallow peeking out.

Cliff crannies are often used as bat bedrooms. The winged mammals tuck themselves safely into cracks and sleep away the day. If you're near a bluff at sunset, you may be treated to a swarm of bats fluttering off to nab insects.

Missouri's oldest living trees are eastern red cedars growing atop bluffs in remote corners of the state. Some of the cedars are nearly 900 years old, which means they started growing more than 600 years before the United States became a country.

What Happened Here?

This messy pile of sticks is an eastern woodrat's nest. Woodrats, also known as pack rats, pick up shiny objects and stash them away in their nests. If they find something better than what they're already carrying, they trade it. Because of this, campers sometimes find sticks where their car keys used to be.





by Bonnie Chasteen

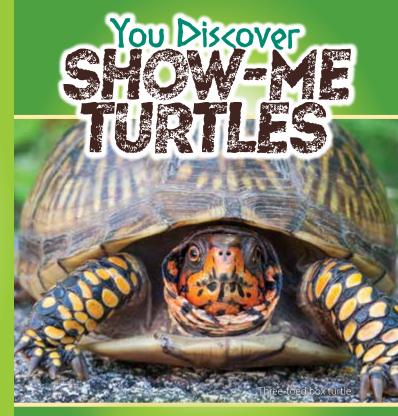
urtles are older than dirt. Along with tortoises, they represent the oldest living group of reptiles on Earth. They appeared on the planet over 200 million years ago, well before dinosaurs made their debut. Turtles haven't changed much since then. With protective shells and other successful survival strategies, they didn't need to. May and June are great months to spot turtles all across the state. You may find them in your yard, or crossing the road, or down by the nearest pond.

But First, Make This Field Guide

- 1 Cut out the next two pages along the dotted lines.
- 2 Fold each cutout down the middle.
- 3 Stack the cutouts so the pages are in numerical order.
- 4 Staple the cutouts together along the middle between pages 8 and 9.
- **5** Grab a grown-up, get outside, and use this guide to ID turtles.

Three-Toed Box Turtle





A Mini Field Guide to 10 Terrific Turtles

Tough but Sensitive

Turtles are awesomely ancient super-survivors, but they're also vulnerable to habitat loss, pollution, and busy roads. That's why all but three of Missouri's 18 turtle species are protected. Here are three simple ways to help Missouri's turtles:

Don't collect turtles for pets. They take a lot of special care, and they often die in captivity. Leaving turtles in the wild ensures all Missouri kids will have cool turtles to find and study.

Help them cross the road. But only if you're completely safe from traffic. Most of the turtles you see crossing the road are young male box turtles looking for mates or mama turtles looking for a place to bury their eggs. Carry them in the direction they were headed (or they may go back to the road), and release them gently into the grass.

Protect turtle nests. If you're lucky enough to see a mama turtle bury her eggs in your yard, cover that spot with a wire cage to keep raccoons and skunks from digging it up.



This small land turtle has an olive-green or darkbrown dome-shaped top shell that is plain or marked with yellow streaks in random patterns. The center of the top shell has a raised edge. The bottom shell is hinged and may have faint markings.

Habitat and Food: Mature oak-hickory forests and brushy fields statewide across most of Missouri. Young eat mostly insects and earthworms, and adults tend to eat more plants, berries, and mushrooms.



Normally, three-toed box turtles have three toes on the back feet, but some can have four.

Catch, Record, and Release

Observe and photograph

The best time of day to spot turtles is morning or early evening when the temperature is between 60 and 85 degrees.

Carry binoculars to study basking turtles from a distance. Missouri Department of Conservation areas are great places to look for turtles. Find a conservation area near you at mdc.mo.gov/atlas.

Handle with caution

Snapping turtles and spiny softshells will bite if provoked, and they can do serious damage to your fingers and toes. Unless they are small, don't try to pick turtles up. Even the harmless box turtle can give your fingers a pinch when they close their shells.



Release immediately

Most Missouri turtles are protected from collection and hunting. Once you've examined, identified, and photographed your find, please be kind, and release it in the area where you found it.



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Plains Box Turtle



Also known as the ornate box turtle, this small land turtle's domed top shell has yellow streaks radiating from the center and a wide, broken stripe running down the length of the shell. Skin can have yellow spots. The hinged bottom shell has radiating dark lines.

Habitat and Food: Missouri's prairie regions and occasionally in the Ozarks. Feeds mainly on insects but will also eat fruits like wild strawberries.



Plains box turtles are known to live up to 50 years.

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Ancient Adaptations

Shaped for Success

Different kinds of turtles evolved in different kinds of habitat, and their bodies show it. All turtles have claws so they can climb up on logs to bask or dig holes to bury their eggs. But most water turtles, like the spiny softshell, also have webbing between their toes to help them swim. In general, land and semi-aquatic turtles have domed shells with hinged bottom shells that open and close like a box. This allows them to pull in all their body parts when predators threaten. Aquatic turtles usually have more streamlined shells, no hinge on the bottom shell, and they're not able to completely protect their heads and legs. A flatter shell and webbed toes allows them to swim fast and escape enemies. Whatever their shape, if turtles can survive until adulthood, their shells help them live long, happy lives.



False Map Turtle



This medium-sized semi-aquatic turtle has an olive-brown top shell with two or three raised peaks and a jagged back edge. The bottom shell is mostly cream-yellow with darker scale borders. A comma-shaped yellow spot appears behind each eye, and the legs are dark with yellow lines.

Habitat and Food: Mainly along stretches of the Missouri, Mississippi, and Osage rivers. Feed on insects, worms, crayfish, snails, dead fish, and some aquatic plants.



Like all basking turtles, false map turtles sun themselves to raise their body temperature and produce vitamin D.

Corthern Map Turtle



This medium-sized semi-aquatic turtle gets its name from the fine, maplike lines that pattern its olive-brown top shell. A distinct yellow spot appears behind each eye, and skin is dark brown with thin yellow stripes.

Habitat and Food: Many Ozark streams and other bodies of water up to northeastern Missouri. Feeds on mussels, crayfish, and some insects.



Map turtles' jaws are adapted to cracking mussel and snail shells.

Mothered by Farth

All turtles lay eggs, and they all bury their eggs on land. Mama turtles will travel long distances to find just the right place. After digging a hole, laying her eggs, and covering them up, the mama turtle leaves the rest to luck. If a raccoon or skunk doesn't dig up the eggs, they eventually hatch. When? That depends on the species and conditions like time of year and weather.



If a western painted turtle lays her eggs late in the summer, the newly hatched babies will remain underground until the following spring.

Temperature-Wise

Like all reptiles, turtles are cold-blooded and rely on their environment to stay cool or warm. When the temperature dips below 60 degrees, they seek the sun. When the temperature rises above 85 degrees, they seek the shade. When winter comes, land turtles burrow below the frost line, and water turtles burrow into the mud or sit on the bottom.



River cooters sleep underwater during cold temperatures by slowing down their body functions and absorbing oxygen through their bottom ends.

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Red-Eared Slide



A large red patch behind each ear gives this medium-sized aquatic turtle its name. Its darkcolored top shell has yellow stripes. The bottom shell is mostly yellow with a dark spot on each scale, and skin is dark green with yellow stripes.

Habitat and Food: Streams, sloughs, ponds, and lakes statewide except for a few northern counties. Feeds on small animals and plants.



The name "slider" comes from this turtle's talent for sliding off basking sites when approached.

Don't touch this turtle! Take a photo from a safe distance, and send it to Jeff.Briggler@mdc.mo.gov. Migator Snapping 1

This is the world's largest freshwater snapping

turtle. It can weigh 150 pounds. The top shell is ridged with five rows of scales. The top jaw is hooked, and the neck is spiky. The long tail has small, smooth bumps.

Habitat and Food: Rare and rarely leaves the water. Found only in extreme southern Missouri, the Bootheel region, and occasionally along the Mississippi River. Feeds mainly on fish.



The alligator snapping turtle can lure fish into its open mouth with a special, wormlike tip on the end of its tongue.

Eastern Snapping Turtle

Approach with caution! This turtle bites.

This large aquatic turtle's top shell is often covered with mud and algae. The top shell also has three large rows of scales and a few raised ridges. The bottom shell and legs are yellowishwhite. The spiked tail can be 10 inches or longer. Average weight is 10–35 pounds.

Habitat and Food: Ponds, lakes, streams, swamps, marshes, and sloughs statewide. Will eat live animals, but mainly scavenges dead animals and plants.



When they're on land and walking tall, a big snapping turtle looks like a dinosaur.

Western Painted Turtle



This smallish semi-aquatic turtle's red-orange patterns look like they've been painted along the edge of its dark, smooth top shell. The bottom shell is yellow-orange, bright orange, or red. Dark, skin has bright yellow (and sometimes red) lines.

Habitat and Food: Marshes, lakes, slow-moving rivers, oxbow lakes, and ponds throughout Missouri's prairie regions. Feeds on plants, snails, crayfish, insects, and occasionally fish.



Turtles have good color vision, and bright colors probably help them recognize members of their own species.

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Eastern Spiny Softshell

6

Approach with caution! This turtle bites.

Unlike turtles with hard, bony shells, this medium-to-large aquatic turtle (7–17 inches) has a flat, flexible, leathery brown top shell with small spines or bumps along the front edge. A light stripe runs from each eye down the neck.

Habitat and Food: Large streams and rivers with sandy or muddy bottoms statewide. Preys on fish, crayfish, salamanders, frogs, tadpoles, snails, and aquatic insects.



This turtle uses its long neck and pointed snout as a snorkel to breathe while it lies buried under mud or sand in shallow waters.

Eastern River Cooter



This is one of Missouri's largest basking turtles. It has a broad, dark top shell covered with yellow circular stripes. The bottom shell is solid yellow. A yellow "Y" appears on the head below the cheek and eye. Skin is dark and marked with yellow lines.

Habitat and Food: South of the Missouri River in large lakes, rivers, and sloughs. Eats aquatic plants and perhaps mussels, crayfish, and insects.



This turtle spends most of its time basking on rocks and logs.

_eave it to Moonlight glimmers across a narrow stream. A sound, like someone crunching celery, carries through the darkness. Suddenly, branches snap, and a tree by Matt Seek artwork by Mark Raithel crashes down. Timber A furry lumberjack waddles out of the gloom. Weighing up to 90 pounds and standing over 3 feet tall, the beaver is Missouri's largest rodent. But size isn't its most remarkable trait. Beavers are big-league builders, making dams and dens with only sticks, stones, and mud. Using its teeth, the beaver nips off a branch then slides into the water. Though the stream doesn't know, its days of free-flowing freedom are numbered. MAY/JUNE 2017 | 11

Tools of the Trade

Beavers don't wear work belts, but they do have many tools to help with their wood-filled, waterlogged construction jobs.

A fat, flat, scaly **tail** works like a rudder and a propeller when the beaver is swimming and like a kickstand when it balances on its hind feet to cut trees.

Short, thick **underfur** keeps a beaver toasty in even the iciest water. Nearly 60,000 hairs cover each square inch of skin.

Glands under the tail produce oil, which a beaver combs through its fur to help it repel water.

Large, webbed **feet** act like flippers when swimming and like snowshoes when walking over squishy mud.

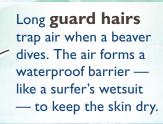
Masters of Downfall

Using only its teeth, a beaver can cut down a willow tree that's thicker than your leg in under 5 minutes. Large trees usually take several nights to drop.

A beaver's five-fingered **front paws** are as nimble as a human's hands. When a beaver eats the bark off a branch, it turns the stick in its paws as if it were corn on the cob.

Wood is tough to digest.
An army of bacteria lives in a beaver's guts and helps break down the wood.

A beaver's front teeth are chainsaw-sharp and never stop growing. If a beaver didn't gnaw wood every day, its chompers would soon outgrow its head. Beavers don't brush their teeth, but that isn't why they're orange. Iron in the enamel turns the teeth rust-colored and makes them hard as steel.



Valves in the ears and nose close tightly when a beaver dives. An extra set of **eyelids** is see-through and acts like swim goggles to protect the eyes underwater.

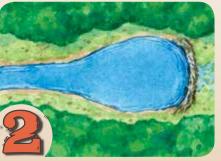
Oversized **lungs** hold enough air to keep a beaver underwater for 15 minutes at a time. **Lips** close behind the teeth, so a beaver can swim while carrying a mouthful of sticks.

Buck-Toothed Builders

Building is a family business. Mom, pop, and the kids work together to turn streams into wetlands, one tree at a time. Here's how they do it.



The beavers begin by stacking branches across the narrowest part of a stream. The branches are held down with rocks and plastered together with handfuls of mud.



Branch by branch, a dam gets built. Water pools behind it, forming a wetland. Soon, the new habitat hums with life as ducks, herons, and muskrats move in.

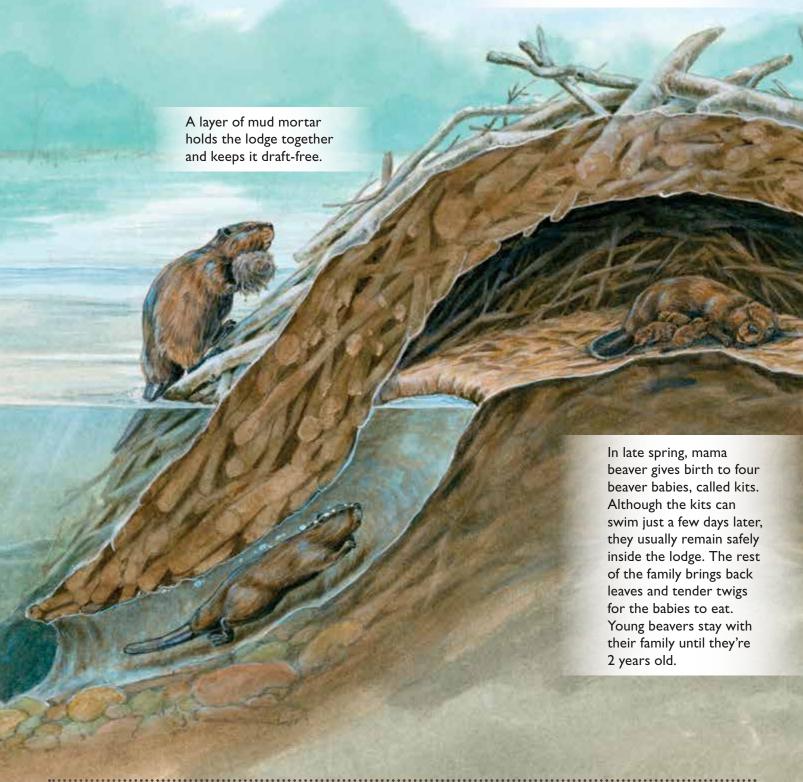


The family builds a sturdy house called a lodge. They pile branches to form a large mound. Then they dig doorways and a living chamber inside. Canals are dug to reach distant trees.

Lodged In

Like a castle surrounded by a moat, a lodge keeps the beaver family safe from enemies such as coyotes and bobcats.

A single room, about 5 feet wide and 3 feet tall, serves as the family's kitchen, living room, bedroom, and bathroom.





THE STRUCCLE TO SURVIVE ISN'T ALWAYS A FAIR FIGHT THIS ROUGH GREENSNAK Illustrated by David Besenger Long on Strength A slim, flexible tail anchors the greensnake to a limb while it sways like a branch within inches of unsuspecting prey. Jaw-Dropping Jaws A stretchable ligament lets the greensnake's small mouth open wide Green on Green when it strikes. With its leafy color, the greensnake can mimic summer foliage almost as well as the katydid can.

High-Stepping Hoppers

Powerful legs are good for launching away from an oncoming attack.

Fight or Flight?

The tree-dwelling katydid's green wings look like leaves and spread like sails when danger appears.

AND THE WINNER IS...



YOUR GUIDE TO ALL THE UNIQUE.

UNIQUE.

AND UNBELIEVABLE STUFF THAT GOES ON IN NATURE



Don't make a squeak.

BARM OWLS have the best hearing of any animal ever tested. Using nothing but their ultra-keen ears, the nocturnal birds can find and catch mice in total darkness.



WHITE-TAILED

DEER fawns turn into toddlers almost instantly. A few minutes after birth, a fawn can stand on its skinny legs and take its first wobbly steps.





PRICKLY PEARS

are twice as pokey as other pointy plants. In addition to its long spines, Missouri's native cactus is also armed with clusters of tiny, barbed prickles.



Here tonight, gone tomorrow. The blossoms of MISSOURI EVENING PRIMROSE last

only a day. The flashy flowers unfurl in the late afternoon, bloom through the night, and wilt the next morning.

If a coyote tries to nibble on a **TEXAS HORNED LIZARD**, it's

in for a nasty surprise. When threatened, horned lizards shoot

blood from their eyes. The blood tastes terrible and startles predators, giving the lizard time to scurry away.



Like many birds, BOBOLINKS

have built-in compasses. Iron oxide (a kind of metal) is found in a bobolink's beak and brain. Earth's magnetic field tugs on the metal, which helps the bird know the direction it's traveling.



RED FOX pups love to play with sticks, feathers, and bones. If the fox family moves to a new den, the parents carry the pups' toys to their new home.









lack bears are one of Missouri's most magnificent mammals. And it's exciting to see one — from a distance. But waking up to a bear rummaging around in your camp can be scary. Here are a few do's and don'ts to make it less likely that a bear will lumber in for an unexpected visit.

Campin Bear Country

DON'T

bring food, soap,
toothpaste, sunscreen, stove
fuel, bug spray, or any other smelly
stuff inside your tent. Bears have
a keen sense of smell and will
investigate anything with an
odor to see if it might
be good to eat.

A FED BEAR IS A DEAD BEAR

out. If you aren't cooking or eating it, put it away.

Rever, ever feed a bear.
Bears that learn to get food from people often become bold and aggressive.
They may damage coolers, tents, and vehicles or harm humans.
When they behave this way, the bear often must be killed.

pour grease or leftover food on a campfire. Instead, let it cool then store it in a bear-proof container.

coolers outside when you aren't using them. Most aren't bear-proof, and bears often know that there's food inside.

or bury trash.

Bears will dig it up.

IF A BEAR COMES CALLING...

If you hear a bear outside your tent, make sure it knows there's a human inside. Flip on a flashlight and yell, "Go away bear!" Most bears are scared of people and will skedaddle into the woods the moment they hear, see, or smell a human.

place your tent upwind and at least **100 yards**away from cooking and food storage areas.

FOOD STORAGE AREA store smelly items away from your tent and cooking area. Place them inside a vehicle with the windows rolled up or in a bear-proof canister. Smelly items can also be hung in a bag from a branch at least 10 feet high and 5 feet away from the trunk.

change into AREA clean clothes before bed. Store the clothes that you wore while cooking in a bear-proof container along with other smelly items.

Wind Direction

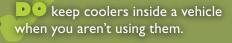
Wash and put away pots and utensils after you're done using them. Wipe off picnic tables. Pick up any scraps of food that you drop.

choose a place to camp away from animal trails, berry patches, and fresh bear sign (tracks, poop, clawed-up trees).

SHOW-ME BLACK BEARS

Biologists think that between 300 and 350 black bears live in Missouri. Most live in the Ozarks, but a few have been spotted in the northern part of the state. Wherever you camp, be bear aware.

COOKING AREA



Sticks Fix

How do beavers know when their dam has sprung a leak? Biologists believe it's the sound of running water that sends the buck-toothed builders into a fix-it frenzy. To test this idea, researchers left a small speaker on top of a leak-free dam. All through the night, the speaker played the sound of gurgling water. When the researchers returned the next morning, they found that beavers had buried the speaker under a thick layer of sticks and mud.

Instructions A leaky dam is driving these beavers bonkers. Help them plug the leaks by writing the letter of each stick next to the hole that it fits. When you're finished, the letters will spell the answer to this riddle:

What did the dentist tell the beaver?

Your teeth look ...



The eastern red bat spends its summer days hanging by one foot from a tree limb, looking a lot like a dead leaf. At dusk, it flits off to hunt for flying insects. It has small

eyes, but it relies on echolocation to "read" its environment. It emits high-frequency sounds that bounce off prey and back into its big ears. The echo pattern tells the bat what to attack and what to avoid.





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FREE TO MISSOURI HOUSEHOLDS



The only completely red bird to visit Missouri, summer tanagers fly from South America to spend the breeding season in North America. Summer tanagers mainly feed on bees and wasps, somehow without getting stung! What's this male tanager doing with a soft, squishy caterpillar in its beak? Most likely carrying it back to his nest of youngsters. It takes thousands of caterpillars and other soft-bodied insects to raise a brood of baby tanagers.