

No. 5910

Animal X-Rays

Real animal x-rays printed on durable transparent plastic are great for years of use on light tables, overhead projectors and white surfaces. Study the interior structure of several mammals, reptiles, fish, amphibians and birds. Explore the process of creating x-rays, while learning interesting features of these 14 animals!

Invented over 100 years ago, the x-ray is now an essential part of the modern world. X-rays are invisible, highly penetrating electromagnetic radiation with a much shorter wave length than visible light. An x-ray is produced when electrons collide with each other and return to their ground state, giving up (in the form of x-rays) the energy they previously held. An x-ray reveals what is inside an object.

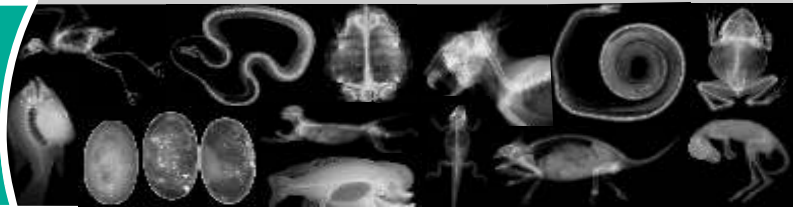
In order to view and assess an x-ray, radiographs are made. A radiograph is simply a photograph of an x-ray. When an x-ray passes through an object it provides a visual image of its interior structure after it strikes a photographic plate. The darkness of the shadows produced on a radiograph depends on the opacity of different parts of the body or object.

There are many applications for x-rays, such as: identifying broken bones for health care, screening luggage at an airport for security and revealing details of an artifact for historical purposes. Can you think of more functions of an x-ray?

Examine the picture cards! These highly detailed photographs match the animal x-rays. Lay the x-ray over the photograph to see how the skeletal system supports the body of each animal.

Compare and contrast the various skeletal structures of these animals. What is similar about the mammals? Fish? Reptiles? Research the definition of each group and determine their similarities and differences. Try listing more animals in each category! Which group do humans fall under?

Draw the animals yourself! Place an x-ray on a light table and cover with a plain piece of paper. Tape the paper in place. Trace around the bone structure with a pencil, marker or crayon. Remove the paper and color in the image. Use your real animal drawing to make a creative collage or to illustrate a story.



Common Marmoset

This small tree-dwelling mammal is found in the tropical rainforests of South America. Marmosets travel in stable groups of 8-10 individuals, which usually contain only one breeding pair. Their habitat consists of trees that produce sap and gum for food and hiding places for protection from predators such as raptors and snakes. They have enlarged and chisel-like teeth to gnaw holes in trees. Adult marmosets have black and gray fur with black fur over their head and neck and bold white ear tufts. Infants have all gray fur. Marmosets can grow to 19cm (7 1/2 inches) (without tail) and have a life span of 12 years.



European Rabbit

This sociable mammal lives underground in very large colonies. They are grey-brown in color and can grow to 40 cm (16 inches) long. They are herbivores, eating mainly grasses, clover and herbs. In winter they eat the bark of trees. They have long, broad incisor teeth, which help to gnaw tough vegetation. Rabbits have glands under their chin that generate a secretion used to mark territory. When they sense danger, they thump the ground with both hind feet, sounding a warning to other rabbits. They have a lifespan of about 9 years.



Infant Kangaroo

The baby kangaroo is called a joey. Joeys are tiny mammals, weighing only 1.5 grams (0.05 ounces) at birth. Female kangaroos give birth to one baby after a gestation of about 33 days. The undeveloped newborn crawls into the mother's pouch where it further develops for six months. They are born with no fur and cannot see or hear. Kangaroos are found in grassy areas in Australia, New Guinea and Tasmania. Kangaroos hop very fast using their powerful hind legs and tail.



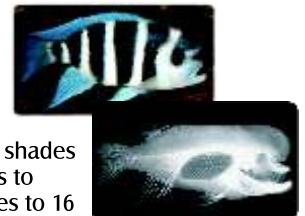
Pumpkinseed Sunfish

This fish species has a body shaped like a pumpkin seed. Their breast and belly are orange to yellow with lighter colored sides in a variety of shades. Their gills are black and have a red dot on the tip. They can grow up to 20 cm (8 inches) in length. They live in weedy, warm water areas such as lake Erie and Ohio River drainage in the northern U.S.A. Pumpkinseed Sunfish are nest spawners. The males make a small hole in the ground using their mouths; females are attracted to this nesting site and lay several hundred eggs, which the males fertilize and guard until hatched. The eggs hatch 3-5 days later and the fry (babies) quickly swim to shallow water along the shoreline for protection. Sunfish feed on insects such as dragonflies, snails and young salamanders.



Frontosa Cichlid

This colorful fish lives in the deep waters of Lake Tanganyika in Africa. They have a white body with five or six vertical black stripes on the sides. Their fins are various shades of blue. Females are 23 to 30 cm (9 inches to 12 inches) and males 35 to 40 cm (14 inches to 16 inches) in length. They have a large hump on their head that is formed from dorsal muscles. Frontosa means "with big forehead" in Latin. As Frontosa Cichlids age, they lose their brilliant color and their humps get larger. They are algae eaters, but also feed on clams and shrimp.



Green Tree Python

Found in New Guinea and Cape York Peninsula of Australia, this python coils on branches in rain forest trees, bushes and shrubs. They are vivid green in color with a broken white or dull yellow stripe. The average length of a Green Tree Python is 1.25 m (4 feet), but some can reach 2.1 m (7 feet)! They are famous for their camouflage ability, which helps them catch small rodents, birds and bats. They can eat while hanging from a branch due to their strong tail. These snakes have heat sensitive pits near their eyes, which they use to tell when a warm or cold blooded animal comes within range.



Western Diamondback Rattlesnake

This nocturnal reptile can be found in the southern United States and Mexico in a variety of locations, such as mountains, plains, deserts and timber areas. They hide in the burrows of other small animals and are often seen on rocks, laying in the sun. They are light brown with diamond-shaped markings on the back and alternating black and white stripes on the tail. Rattlesnakes are venomous and have depressions on the front of their eyes that sense heat and help in detecting prey. They smell with the tip of their tongue. They will eat anything that is alive, warm and furry. They prefer small mammals, such as mice, rats and rabbits. Their most distinguishing feature is the rattle at the end of the tail, which is used to scare off intruders. Diamondbacks measure 76 to 182 cm (30 to 72 inches) in length and have a lifespan of over 15 years.



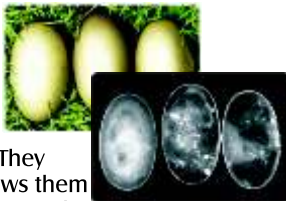
Infant Green Iguana

The green iguana is found in tropical rainforest areas throughout Central and South America. This reptile will grow between 1.2 and 1.8 m (4 and 6 feet), including the tail, which makes up about half the body length. They are green in color with black stripes. Their skin is rough, water resistant, and has pointy scales along the back. Their long fingers and claws are used to climb and grasp. Green Iguanas can store fat under their jaws and in their necks for times when food is not available. They lay many eggs at a time in burrows. They build pretend burrows to fool predators looking for food. The female does not return to the egg site and the young grow up on their own. It takes them two years to become adults. They eat plants, eggs, insects and small vertebrates.



Dwarf Crocodile Eggs

Dwarf Crocodiles live in fresh water, slow-moving rivers, lakes, swamps and marshes in West Africa. This reptile eats fish, birds and small land vertebrates. They are nocturnal and travel on land and in water. They have a special valve in their throat that allows them to open their mouth under water. They have rigid teeth and rough scales. The female assembles a mound of vegetation and places a clutch of eggs inside. She will guard the nest and raise the young. The crocklets (babies) chirp to the mother from inside the egg. Their sex is determined by the temperature at which the egg is kept. Once hatched, the mother carries them in her mouth down to the river for their first swim.



Veiled Chameleon

This slow-moving lizard can tolerate extreme temperatures and levels of humidity. They are found in the deserts of Yemen and southern Saudi Arabia. Veiled Chameleons have brown, tan, turquoise, green and white scaly skin. They have the ability to change color. When excited or afraid (in dark or cold temperatures) they turn pale. When angry (in bright light or hot temperatures) they become darker in color. This reptile lives in trees and can sit still for long periods of time. Each eye can swivel nearly 180 degrees and both eyes can point in different directions at the same time. They have a long tail and a fast, sticky, tongue that is longer than their body! They catch their prey (insects) with this unique tongue.



Box Turtle

Found in North America, this land-dwelling reptile prefers fields and forests. They must hibernate during cold weather since they are cold blooded. They bury deep under the soil and leaves until April or early May. They have a tough high-domed shell that is dark brown to black in color with green, orange, red or yellow markings. They can pull their head, legs and tail into their shell for protection. The average length of most adult box turtles is 13 to 15.5 cm (5 to 6 inches). They eat both plants and animals and have powerful jaws and sharp beaks, but no teeth. Eggs are fertilized within the female's body. She digs a hole in warm ground with her back feet, lays her eggs and covers them with soil and sand. She then leaves the 3 to 6 eggs to hatch on their own. Box turtles have a lifespan of 30 or 40 years and some have lived to reach 100 year olds!



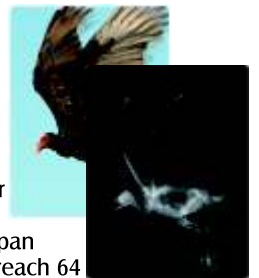
Red-Tailed Hawk

This large bird lives throughout North America. In the winter, many will move south. They weigh between 0.9 and 1.8 kg (2 and 4 pounds) and females are larger than males, having a wing span of 1.4 m (56 inches). They are carnivores, eating mostly small rodents, rabbits, snakes and lizards. Adults are dark brown on the back and top of their wings and light brown on the breast and belly. They have cinnamon brown on their heads and neck and a broad, rounded rusty red tail. Their eyesight is eight times as powerful as a human's! Both males and females build nests, where the female lays 2 white spotty eggs. The female incubates the eggs while the male provides food, bringing it to the nest. The hatched young are covered in feathers and require a lot of food. They stay in the nest for 45 days and then fly away.



Turkey Vulture

The Turkey Vulture is commonly found in the United States, along the east and west coasts of Canada and throughout South America. They are best known for their featherless red head. They have dark brown bodies with white and silver feathers along the underside of their wings. While in flight, the Turkey Vulture spreads its wings into a V-shape, with a wingspan reaching 2 m (6 feet). As adults, they typically reach 64 to 81 cm (25 to 32 inches) in length. These birds never feed on live prey. Turkey Vultures have excellent eyesight and a highly developed sense of smell. They do not live in traditional nests but build their homes on the ground or in caves.



Leaf Frog

This amphibian comes from a small group of islands near New Guinea. They have a strong build and can grow to over 3" (8 cm) long. The females have a larger and stockier build than males. They are brown and resemble a leaf, helping them to blend into the leaf litter on the ground. Their flat triangular head allows them to push into hiding spots. Leaf Frogs are carnivorous with teeth in both upper and lower jaw. They eat crickets, mealworms, pinkies, earthworms and lizards. This species of frogs does not have a tadpole stage. The female lays eggs in soil and leaf litter. Tiny froglets hatch about 30 days later.

