

THE BLACK PANTHER

A SCIENCE 3D ADVENTURE

GRADE 3



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KEY WORDS

Look for these words and see if you can figure out their meaning.

ADAPTATION

CAMOUFLAGE

CHRYSA LIS

HERBIVORE

HIBERNATION

LIFE CYCLE

METAMORPHOSIS

OFFSPRING

ORGANISM

PREDATOR

PREY 1.

TERRITORY

TRAIT



TABLE OF CONTENTS

Meet Saya

2

Similar But Different

3

Growing Up

6

Built For Success

8

Life In Nagarhole Forest

10

How to Survive

16

Tracking The Black Panther

22

Glossary

27

MEET SAYA

What do you think of when you hear Black Panther? Some people think about the superhero in comic books and movies. But did you know that there is a *real* black panther?

Meet Saya. He lives in India, in Nagarhole National Park. He may be called a black panther, but he is actually a leopard. Most leopards are yellow with black spots. But sometimes a leopard is born with black fur. Black panthers, like Saya, are very rare. This means there are not many of them. Why are they rare? How does a yellow leopard have a cub that is black? Let's investigate!



2

The panther's name - Saya - means "shadow" in the Hindi language. Why do you think Saya was chosen as a name for the black leopard?

SIMILAR BUT DIFFERENT



All plants and animals look like their parents in many ways. But, they don't look *exactly* the same. Saya's mother and father are both leopards that are yellow with black spots. Most of his brothers and sisters are also yellow leopards. Even though Saya looks different from his parents, they are still very much alike. Saya and his parents have the same body shape, big teeth, and long twitching tail. He is just a different color.



These leopards are brother and sister. How are they similar? How are they different? Can you think of ways you are similar and different compared to other students in your class? Can you think of ways you are similar and different compared to other members of your family?

Other animals and plants look a lot like their parents. That is because plants and animals inherit **traits**, or features and behaviors, from their parents. But, like Saya, they have differences too. Look at the photos of different **offspring** with their parents, then think about the following questions:

1. Can you find ways all the offspring, or young, are like their parents?
2. Can you find ways they are different from their parents?
3. How are the young different from each other?

Tadpole



Frog



Duck and ducklings



Sperm whale and calf

Langur monkey and baby



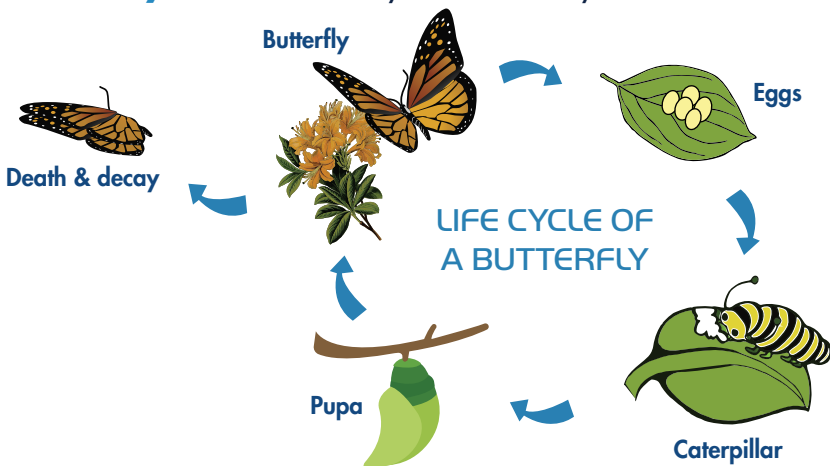
GROWING UP

All animals grow up to look a lot like their parents. Some animals look like their parents when they are young. Baby leopards, called cubs, look a lot like their parents. Then they grow bigger. Eventually they are old enough to have cubs of their own.

A leopard mom and her cub

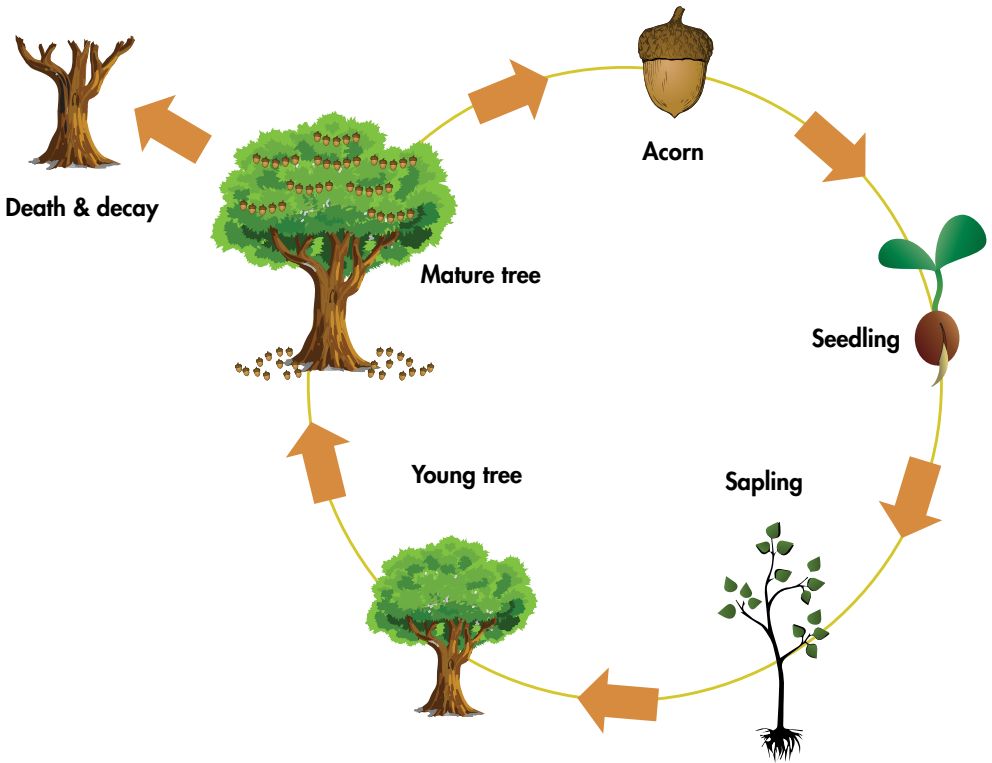


Not all animals start out life looking like their parents. Let's take a closer look. Butterflies lay eggs. When the eggs hatch, caterpillars come out. They don't look like butterflies. A caterpillar eats and grows. Then, it builds a **chrysalis**, or a hard-shelled pupa, around itself. Inside the chrysalis, the caterpillar's body transforms into a butterfly. This is called **metamorphosis**. The butterfly breaks out of the chrysalis. When the time is right, it will reproduce and its young will start their **life cycles**. Eventually, the butterfly will die.



Different **organisms** have different life cycles. Look at the life cycle of the tree below. How is it similar and different to the life cycle of a butterfly?

LIFE CYCLE OF AN OAK TREE



Some animals are ready to live alone when they are born or hatch, like sea turtles. Some need to spend years with their mother, like walrus.

BUILT FOR SUCCESS

Animals and plants have structures and behaviors, called traits, that help them survive. Trees have leaves to help them get sunlight. Leopards, like Saya, have claws to help them climb and catch **prey**, or food.

All leopards are **predators**. This means Saya eats other animals. His body is shaped to help him find, catch, and eat prey. The shape of his ears helps him hear the animals he hunts, like deer and monkeys. His nose helps him smell them too. He has excellent eyesight. He can see even when it is almost completely dark!

Saya has powerful legs that help him run and jump very fast and high to catch his prey. He has a tail that helps him balance when he runs. He also has big teeth and strong jaws. Now that sounds like a superhero!



Saya's black coat makes him different from other leopards. A leopard with a typical yellow color pattern can use its spots as **camouflage** to blend in and to sneak up on its prey. But Saya stands out, which could make it hard to sneak up on prey. Is his black coat an **adaptation**? Probably not since it doesn't help him survive.

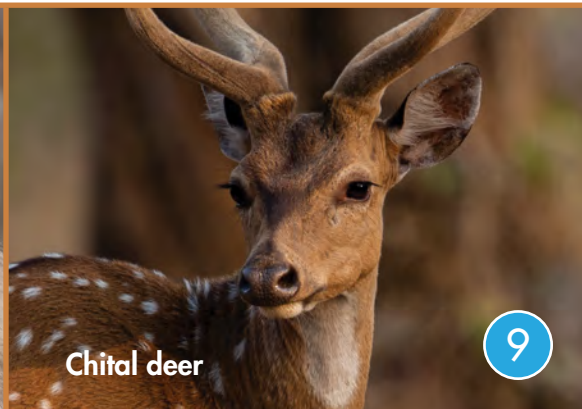


Having a black coat may not always be a good thing if you are a leopard. A leopard with a yellow color pattern blends in better in this habitat.

Prey need to be able to protect themselves from predators. They have adaptations to keep safe. Langur monkeys and chital deer are two kinds of prey that Saya eats. The deer have excellent noses and can smell a predator even without seeing it. This helps them escape. Monkeys live high in trees and have excellent eyesight. They can spot a predator from very far away. Then, when one monkey sees danger it calls to the other monkeys to warn them. All of these adaptations make it difficult for Saya to sneak up on his prey.



Langur monkey



Chital deer

LIFE IN NAGARHOLE FOREST

There are two main seasons in the forest, a wet season and a dry season. In the wet season there is a lot of rain. The trees and other plants are very green. Their leaves capture sunlight and turn it into energy. The plants produce flowers and reproduce. During the dry season there is very little rain. There isn't much water for the trees. A lot of water is lost through leaves. This causes them to drop when the dry season comes. This is an adaptation to save water. In forests that get much colder than Nagarhole, most trees drop their leaves in winter. This helps them save energy and water.



When there is plenty of rain, leaves are green and turn sunlight into energy.



HERBIVORES OF NAGARHOLE

Many kinds of animals live in the forest with Saya. Some of them only eat plants. These are **herbivores**. They have adaptations to help them get food. They also have adaptations to stay safe from predators.

Trunks have up to 40,000 muscles! They can tear down trees or pick up a single leaf.



They can weigh 5,400 kg (12,000 lbs). Their large size makes them dangerous to catch.

Big feet make it easy to kick up grass to eat. They support a lot of weight.



Tusks help push down trees and can be used to defend themselves from predators.



This Indian elephant is called Bogeshwara. He's thought to have the largest tusks in Asia.

Gaur, the Indian buffalo

Sharp horns help defend from predators.



Stomachs help digest plants efficiently.



Large herds defend their young from predators. There is safety in numbers when gaurs stick together.

Langur monkey

Good eyesight for spotting predators.

Special calls to alert troop of approaching danger.

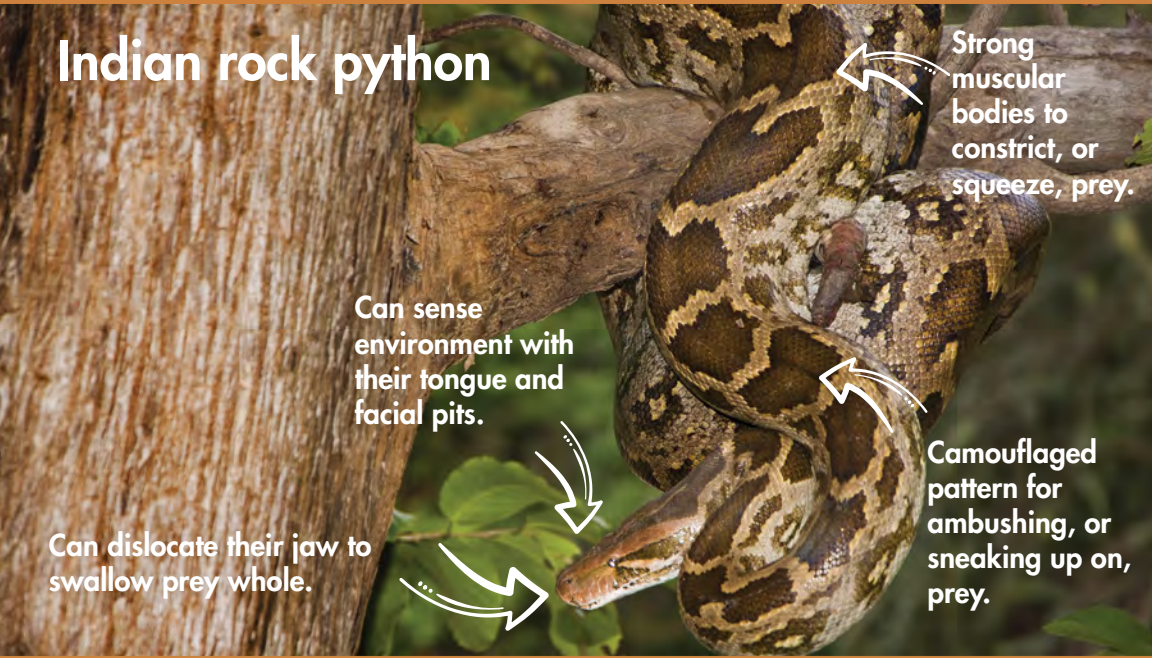
Tails provide balance.

Dexterous hands and feet for climbing and picking leaves and fruit.

PREDATORS OF NAGARHOLE

Saya and other leopards are not the only predators in the Nagarhole forest. These predators are adapted to catch different kinds of prey and survive in the forest.

Indian rock python



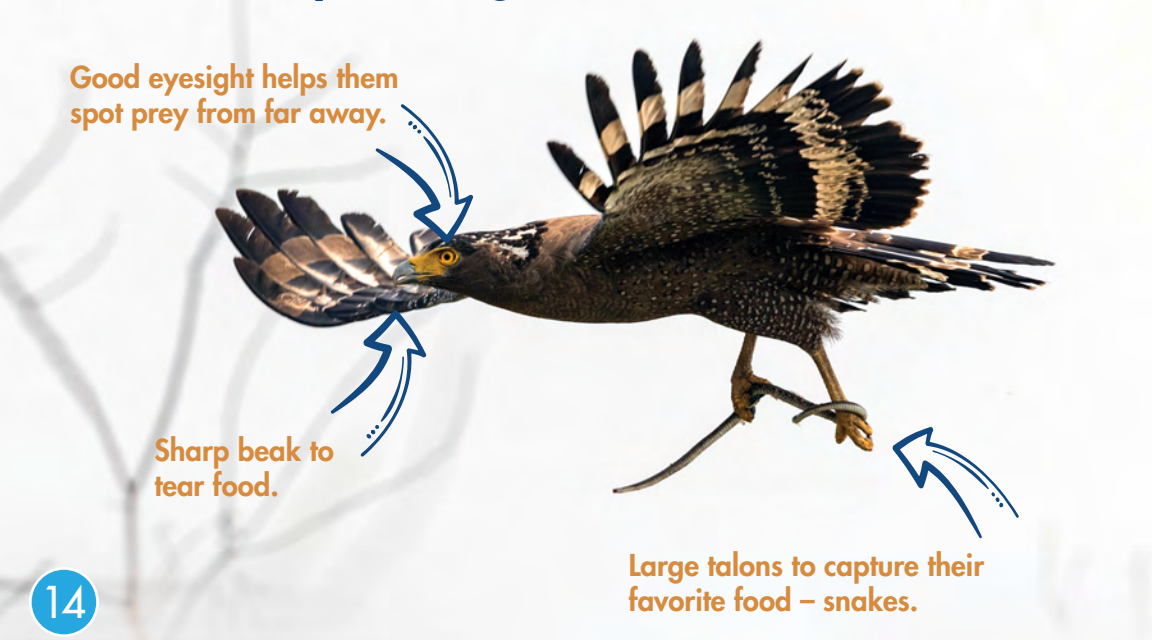
Strong muscular bodies to constrict, or squeeze, prey.

Can sense environment with their tongue and facial pits.

Camouflaged pattern for ambushing, or sneaking up on, prey.

Can dislocate their jaw to swallow prey whole.

Crested serpent eagle



Good eyesight helps them spot prey from far away.

Sharp beak to tear food.

Large talons to capture their favorite food – snakes.

Dhole (Asian wild dog)

Live in packs, using teamwork to hunt.



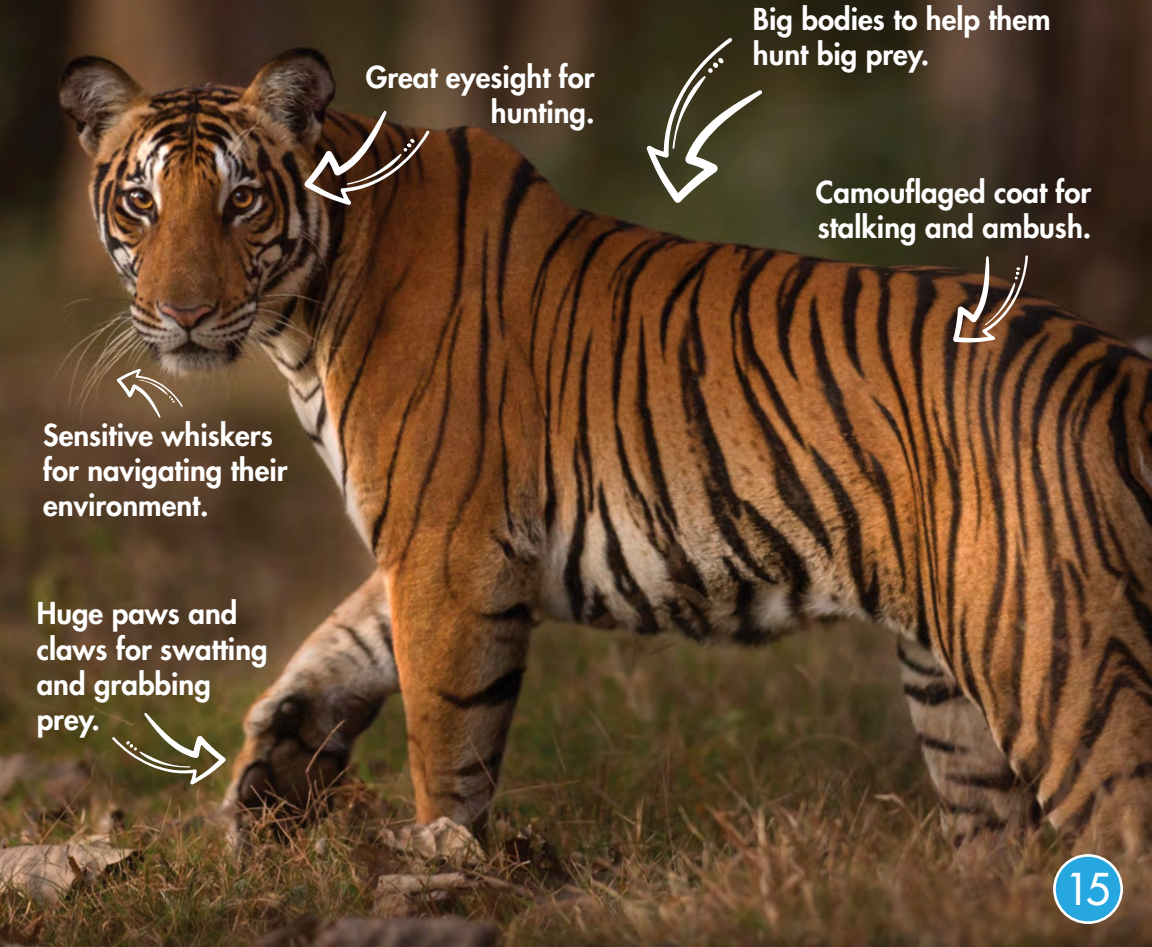
Excellent sense of smell.

Strong jaws for chewing bone.

Legs built for chasing prey.

Bengal tiger

Big bodies to help them hunt big prey.



Great eyesight for hunting.

Camouflaged coat for stalking and ambush.

Sensitive whiskers for navigating their environment.

Huge paws and claws for swatting and grabbing prey.

HOW TO SURVIVE

Many behaviors help animals find food and shelter to survive. Herbivores like deer need to find enough plants to eat. They also need to find the *right* plants to eat. Some plants taste bad or could poison herbivores. They know how to avoid these plants.

Predators like Saya need to find and catch prey. Saya knows where in the forest to hunt. He also knows how to sneak up on prey. Yellow-coated leopards use their spots to blend in and sneak up on prey. Black panthers, like Saya, use shadows to blend in.



A photograph of a spotted deer standing on its back legs in a forest. The deer is brown with white spots and is reaching up with its mouth open to eat leaves from a tree. The background is a blurred green forest.

Deer normally stand on all four legs, but when there are good leaves to eat that are too high, they can stand on their back legs!

Shelter is important for most animals. Can you think of why they need shelter? Like people, they may need to stay dry and warm. Some animals need places to stay safe from predators. For Saya, he needs to find shade to avoid overheating when it gets too hot.



Some animals, like Gila monsters, find shelter in burrows. Others, like owls, find shelter in trees. In colder parts of the world, animals may need a place to stay warm in winter. Some animals, like bears, sleep through the winter when it is too cold. This is called **hibernation**. It never gets too cold in Nagarhole. The animals there don't need to hibernate, but they still need shelter.



Gila monster in burrow



Owl in tree hole



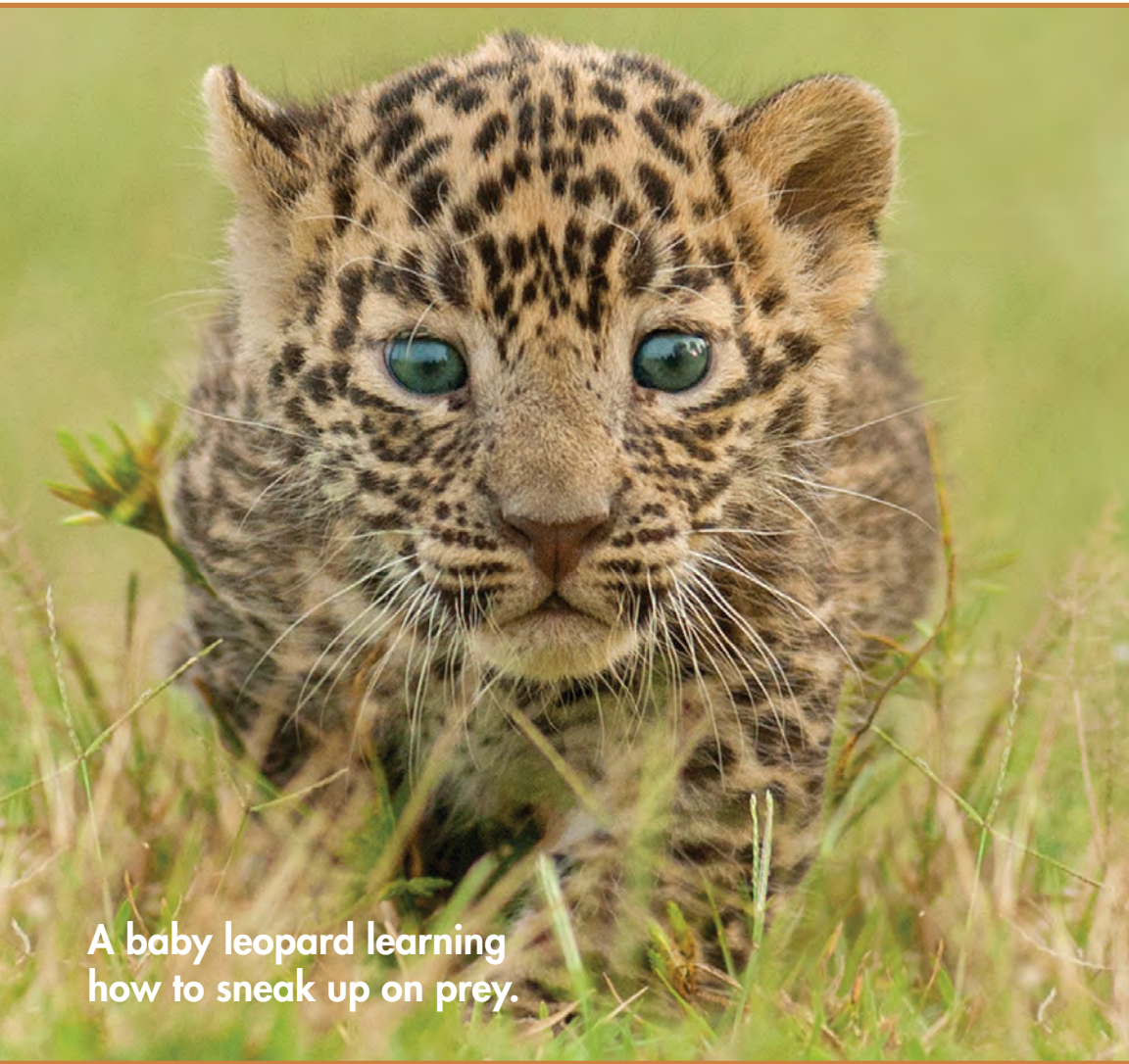
Bear in cave

Living with other animals can help prey survive. Deer and elephants live in groups to stay safe from predators. The group can help them see a predator in time to run. It can also help them escape. Some predators also live in groups. For example, wild dogs live in groups so they can work together to raise their young and catch bigger prey. Other animals live alone. Leopards like Saya are solitary. They do better hunting and living on their own.



Which of these animals are solitary?

Animals learn some behaviors from their parents, or other animals. For example, Saya's mom taught him how to hunt for himself. Elephant mothers teach their young where to find the best plants to eat.

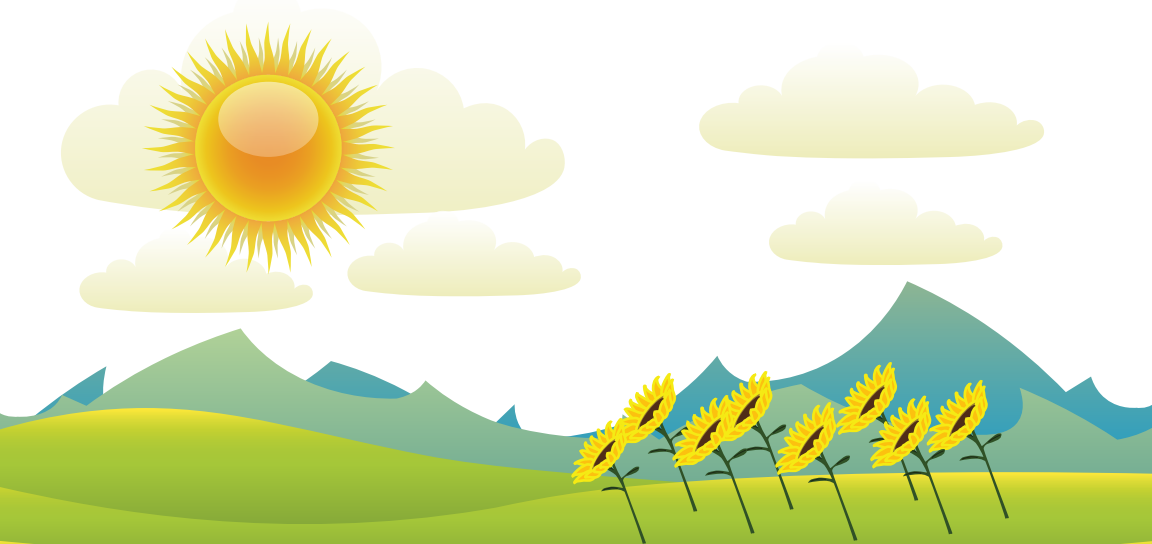


A baby leopard learning how to sneak up on prey.

Not all behaviors are learned. Sometimes animals just know what to do. Spiders can spin a web without learning. Tadpoles know what to eat without being taught. Saya knows to find water when he is thirsty.



Like animals, plants can respond to their environment in many different ways. Flowers can close at night. The stem of a plant can slowly bend towards sunlight. Some plants can produce nasty chemicals to keep animals from eating them. In the Nagarhole forest, most trees respond to not having enough water in the dry season by dropping their leaves.



Young sunflowers can turn to face the sun as it moves across the sky.

TRACKING THE BLACK PANTHER



Meet Shaaz Jung. He's a naturalist and photographer. He loves animals, especially big cats like tigers and leopards. He spends his days looking for and observing these big cats. He loves to learn more about them and to take pictures of them.

His favorite animal to spend time with is the black panther. He spends all day in the forest, searching for Saya. He has the right tools for searching. His truck is built to handle rough conditions. His binoculars help him scan the forest. When Shaaz finds Saya, he observes his behavior and takes pictures. Having the right camera lens and good binoculars help him stay far away so he doesn't disturb him.

Explorers need the right tools!



It can be very difficult to find Saya. But, Shaaz knows that he loves to hide in a type of tree called a banyan. Banyan trees are one of the world's largest trees. Their wide branches make a perfect resting spot for Saya. Also, it is one of the only trees in the forest that doesn't lose its leaves in the dry season. This gives Saya shade that helps him stay cool.



Knowing how leopards behave, helps Shaaz find Saya. Each leopard has a **territory** in the forest that they live in and defend from other animals. It's a big place, but Shaaz knows where each leopard lives so he knows where to start looking for them.



Shaaz has to track the animals by watching and listening. He checks the ground to look for footprints called "pugmarks." Shaaz can tell if the pugmark was made by a leopard, a tiger, or another kind of animal. He can also tell the direction the animal was moving. If it is a leopard pugmark, Shaaz can even tell if it's a male or female. Male leopards have pugmarks that are more square than female pugmarks.





Shaaz must always listen when tracking big cats. If the panther is close by, he listens for alarm calls made by the deer and the monkeys. This tells Shaaz where Saya or another predator might be in the forest.

Now that you know how to track the *real* black panther you are ready to join Shaaz to see if you can find Saya and learn more about these amazing big cats!





GLOSSARY

ADAPTATION

a trait of an organism that helps it survive in its environment

CAMOUFLAGE

color that lets an animal blend into the environment

CHRYSAIS

the hard-shelled pupa of a moth or butterfly

HERBIVORE

an animal that eats plants

HIBERNATION

a dormant condition during the winter

LIFE CYCLE

the changes that happen to an organism during its whole life

METAMORPHOSIS

a change in an organism from one form to another

OFFSPRING

the young produced by an organism during reproduction

ORGANISM

a living thing

PREDATOR

an animal that catches and eats other animals

PREY

an animal that is eaten by other organisms

TERRITORY

an area defended by an animal against others of the same species

TRAIT

a feature passed down from parent to offspring



PHOTO CREDITS

Abbreviation Key: SJ = Shaaz Jung; SS = Shutterstock.com; NASA = National Aeronautics and Space Administration

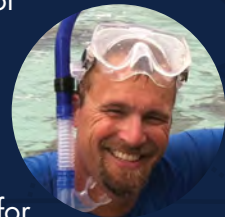
Front cover, SJ; 1, SJ; 2, SJ; 3 (top), SJ; 3 (bottom), Eric Isselee/SS; 4 (middle), Eric Isselee/SS; 4 (bottom left), Paramonov Alexander/SS; 4 (bottom right), Wayne Osborn; 5, John Cullum; 6, SJ; 7 (bottom left), Tryton2011/SS; 7 (bottom right), JHVEPhoto/SS; 8, SJ; 9 (top left), SJ; 9 (top right), John Cullum; 9 (bottom left), Symbio Studios; 9 (bottom right), John Cullum; 10 (top), John Cullum; 10 (bottom), John Cullum; 11, SJ; 12 (top), SJ; 12 (bottom), Visanuwit Thongon/SS; 13, Symbio Studios; 14 (top), Meet Poddar/SS; 14 (bottom), Wang LiQiang/SS; 15 (top), John Cullum; 15 (bottom), SJ; 16, SJ; 17, SJ; 18, SJ; 19 (top), John Cullum; 19 (middle left), SJ; 19 (middle right), SJ; 19 (bottom), SJ; 20, SJ; 21, SJ; 22 (top), SJ; 22 (bottom), John Cullum; 23, SJ; 24 (top), SJ; 24 (bottom), John Cullum; 25 (inset), John Cullum; 25 (background), John Cullum; 26, SJ; 28, SJ; Back cover, SJ.

SCIENCE 3D

Thanks for exploring with us! Our science adventures take us around the world to uncover secrets of the most amazing animals and places. Our mission and passion are to share these scientific discoveries with you. There are so many cool things to see out there, even in your own backyard, so get outside and explore!

MIKE HEITHAUS, Ph.D.

Dr. Mike Heithaus is an explorer, author, educator, and television host. He is a professor of biology and Dean of the College of Arts, Sciences & Education at Florida International University. Mike and his students study sharks, whales, sea turtles, and other large marine animals around the world. They also work with people to help protect these species. Mike loves sharing his work with others. He has written textbooks and helped create programs for students in elementary, middle, and high school. He has been on television programs on PBS, National Geographic, and Discovery Channel's Shark Week.



PATRICK GREENE

As a wildlife filmmaker, Patrick has always had a passion for animals. He started to draw pictures of sharks and whales when he was just five years old. Later, he went to college to become a marine biologist and learned a lot about science. Then he got a job in television and learned how to make videos too. Since then, he's gone all over the world studying and filming wild animals. He's made shows for National Geographic, PBS, and ABC, and even won an Emmy Award. He loves making videos to teach students about science and about the many creatures that share our world.





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