



Predators and Prey

IN THE FILM

earth features unique sequences of predation. Technical advances have made it possible to film some of the fastest and most deadly predators in action including the cheetah, lion and Great White shark. This remarkable footage shows, for the first time, in second-by-second detail, how these animals stalk and catch their prey. The sequences will make a riveting starting point for a study of feeding relationships focusing on how predators are adapted to locate, catch and kill their prey and how prey species are adapted to detect and avoid predators. They can also be used as the starting point for a study of food chains and food webs.

FOOD CHAIN FACTS ...

- nearly every living thing on Earth is dependent on the sun's light for energy
- most of the sun's energy is trapped and converted into food by plants through photosynthesis
- energy is transferred from plants into animals by the herbivores that eat plants
- energy is transferred again as carnivores eat animals



THE LIONS OF CHOBE

LION FACTS...

- lions are the only cats to live socially in prides
- prides are made up of related females and could number 2 to 40 cats
- female cubs stay in their pride; males leave between the ages of 2 and 4
- the males in a pride are incomers who have taken over control from other males
- male lions are the only cats with manes
- lions roar to establish their territory and to communicate with pride members
- a lion can run for short distances at 50 mph (80 kph) and leap as far as 36 ft (11 m)

Lions live all over sub-Saharan Africa in plains or savannahs where they have a plentiful supply of prey on which to feed.

earth follows the lions of Chobe national park in Northern Botswana.

SAVANNAH FACTS...

- 'savannah' is the name given to grassland in Africa
- grasslands are one of the Earth's major terrestrial biomes
- grasslands are large open spaces with few bushes and trees
- large herds of grazing mammals live on grasslands
- grass feeds more animals than any other plant does

The lions of Chobe national park live in some of the largest prides in Africa. A pride could be as many as 30 strong. In these numbers they are a major threat to the animals that come to the park's water holes. Usually, the lions prey on smaller mammals like Thomson's gazelles, zebras, impalas and wildebeest, although some prides do target larger animals like buffalo and giraffes.

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THE STRENGTH OF A LION

Lions are powerful cats. They have broad heads and thick, strong legs. Their back legs are designed to spring and their front legs to grab. They do both of these in bringing down their prey. When a lion is jumping, the tail plays an essential part in maintaining its balance.

STALKING AND STRIKING

Lionesses in a pride do most of the hunting. They often work as team, which gives them a huge advantage. Some drive prey toward others who lie in wait. If their prey is some distance away, lions may move quite quickly towards them at first. As they get nearer they sink into their stalking posture with heads and bodies low and eyes fixed on their prey. They freeze if the prey turns in their direction, then move forward as the prey looks away, or down to continue feeding. If they're lucky, the lions will get within striking distance, around 20-30 yards (20-30 meters) from their prey. From that distance they can make a short rapid charge and pounce. As it pounces, a lion uses its front legs to slap or grab the prey, bringing it down, then killing it with a bite to the throat or neck from its powerful jaws.



HUNTING ELEPHANTS

Drought forces these two animals together as the elephants come to the few remaining water holes in a desperate search for water. The lions ignore the strong adult elephants and search out young calves or weak elephants. The hunt is not without risk for the lions. Elephants will use their trunks and tusks to beat off lions and some of the hunting pride will be injured in the chase. Elephant mothers will attack lions to protect their calves. No more than one in four of a lion pride's attempts to hunt an elephant will succeed. By hunting at night, they give themselves an advantage. A lion's night vision is far better than an elephant's. Where the lions do succeed, it is the sheer number of lions attacking that will bring an elephant down. An elephant carcass will feed the pride for a week.



THE CHEETAH HUNT

CHEETAH FACTS...

- it is the world's fastest land mammal
- it can accelerate from zero to 40 mph (65 kph) in three strides and to its full speed of 70 mph (113 kph) in seconds
- as it nears full speed a cheetah is running at about 3 strides per second
- its respiratory rate climbs from 60 to 150 breaths per minute during a high-speed chase
- it can only run 400 to 600 yards (360 to 550 meters) before it's exhausted

The sequence of the cheetah hunting in the Maasai Mara was filmed using for the first time an ultra high-speed “photron” camera. This can shoot one thousand frames a second and slows down the hunt by more than forty times. This slowing of the action makes it possible to see the physical features of the cheetah in extraordinary detail. Every frame of this sequence demonstrates how the cheetah's adaptations make it one of Earth's great predators.

BORN TO RUN

From the tip of its nose to the tip of its tail, the cheetah is built for speed and hunting. Its head is small and its face flat. This shorter muzzle length means that its large eyes are positioned to give it maximum binocular vision. Enlarged nostrils and extensive air-filled sinuses vastly aid its breathing. It has a powerful heart and large, strong arteries.

The cheetah's body is narrow and lightweight. It has long, slender feet and legs and specialized muscles which give it fast acceleration and allow greater swing to its limbs. Its hips and shoulders swivel on its highly flexible spine. This curves up and down as the cheetah runs and its limbs alternately bunch up and then extend, giving greater reach to its legs. As it runs, only one foot at a time touches the ground, and there are two points in its 20-to 25-foot (6 to 7.5 meter) stride when none of its feet are on the ground, as they are fully extended and then totally doubled up.

The cheetah's tail is long and muscular; it acts as a stabilizer for the animal by counteracting its body weight and preventing it from rolling when it makes a fast turn at speed. Its paws are less rounded than those of other cats and have hard pads that give the cheetah grip. It's the only big cat with short, blunt claws that cannot completely retract. These too grip the ground when the cheetah is running.

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THE GREAT WHITE SHARK

GREAT WHITE SHARK FACTS...

- the Great White is the world's largest predatory fish
- a Great White can grow to 20 ft (6 meters) in length and can weigh up to 4,400 lbs (2,000 kilograms)
- a Great White can have around 3,000 teeth in its mouth at any one time
- a Great White's teeth are up to 3 in (7.5 cm) long

HUNTER FROM THE DEEP

The Great White shark is a streamlined swimmer and a deadly predator. It has a torpedo-shaped body, with a pointed snout and crescent-shaped tail. The white underbelly of the shark gives it its name. Its upper surface is gray to blue gray and blends with the color of the waters it inhabits. This gives it an advantage in hunting its prey.

The shark attacks its prey from below at a steep angle giving itself the best chance of being unnoticed. In making an attack, the Great White sometimes swims so fast that it actually jumps out of the water, as it is seen doing in **earth**. It is one of only a few sharks than can jump fully out of the water in this way.

The Great White's teeth are not used to chew. They rip their prey into mouth-sized pieces to be swallowed whole. The teeth are triangular, serrated and razor-sharp. They are located in rows. The first two rows are used on prey; the other rows rotate into place as they are needed. As teeth are lost, broken, or worn down, they are replaced by new teeth that rotate into place.



PREDATOR AND PREY: ACTIVITIES

GRADES K-2: WHO EATS WHAT?

Learning objective:

- to understand that animals, including humans, need food and water to survive

It may be best with younger children to focus less on predation and more on thinking about animals' need for food and water to survive. While some children may find it unremarkable or fascinating that animals hunt and eat other animals, to others this may be a new and perhaps disturbing thought. The predation sequences in the film do not dwell on the moment of feeding but do show in detail the hunt. If children wish to explore predation further, other activities can be adapted to a level appropriate for them.

Tasks

1. Talk about what children eat and drink. What different foods do they eat? Make a list of what they eat in a day. Do they know why they eat and drink?
2. What do children know about what the animals around them eat and drink? These could be animals in the wild, working animals, or family pets. Make a chart or a display of animals, including human animals, and their foods. Draw pictures of the animals and add labels to show their food.

GRADES 3-6: INTERDEPENDENCE AND FOOD CHAINS

Learning Objectives:

- to understand that living things in a habitat are interdependent
- to understand that food chains show feeding relationships and begin with the sun's energy
- to construct a food chain

Tasks

1. To understand the nature of a food chain it is key to understand that plants are the only living organisms that make their food and that they use energy from the sun to do this. An easy experiment to demonstrate this is watching the effect of keeping a plant in the dark for a week and then returning it to the light.
2. The deciduous forest sequence in **earth** is an ideal focus for a study of a woodland food chain. How many different plants and animals can children see in this sequence (e.g., snowdrops, daffodils, bluebells, red fox, thrush, red deer, caterpillar, cherry tree, oak tree)? Draw or paint a woodland background and add to it photographs or drawings of these woodland plants and animals. Try constructing a food chain for this woodland. Join up the plants and animals in the chain. A plant must be at the beginning of the food chain.
3. Talk about what would happen if one or more elements of the woodland food chain suddenly disappeared? What if a disease killed all the caterpillars? What would the consequence be?
4. Play "Mixed-Up Food Chains": put the food chains in order (e.g., grass-fox-rabbit, caterpillar-leaf-owl-sparrow-eagle, etc.)

Predators and Prey – Activities



GRADES 7-12: PREDATOR OR PREY?

Learning objectives:

- to understand that predators are adapted to locate, catch and kill their prey
- to understand that animals are adapted to their food source
- to understand that prey species are adapted to detect and avoid predators

Tasks

1. The sequences of predation in **earth** provide a superb, quality resource through which to explore the characteristics of the featured predators. What adaptations demonstrated by the animals featured in **earth** make them successful predators? How is each animal particularly adapted to its food source? Create a guide to each predator describing its adaptations and its prey. This could be a wall poster or booklet.
2. What adaptations do the animals have in common? What factors are different? Is it possible to say there are certain adaptations that most predators have (e.g., acute vision and sense of smell)? List the common adaptations.
3. What kind of adaptations do these animals' prey have that help them evade their predator and survive? Think about the caribou and Thomson's gazelle being hunted by the wolf and cheetah (e.g., speed, agility, stamina, acute senses, positioning of eyes, startle response, etc.)
4. Play "What Eats What?" Collect pictures of the animals in **earth** and research the food chains to which they belong. Put these on a card. Players all begin with four cards and try to collect the complete food chain by asking other players if they have the card they need. If they have it, other players must hand it over. If they don't have it, the player selects another card from those remaining in the pack. The winner is the player who lays down all their cards in food chain sets.
5. The deciduous forest sequence in **earth** could be used to create a food web. After making as many food chains as possible using the animals and plants in this sequence, these could be combined into a food web. Who can make the most chains and create the most intricate web?
6. Discuss how changes happening in the world today might threaten the plants and animals in a food chain.