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ABSTRACT

This curriculum guide was developed for use with public television's Nature series. The materials in the guide are designed to help students actively participate in the study and experience of nature. Students are encouraged to view the programs as naturalists would in order to gain a better understanding of animals, their habits and habitats, and other factors that affect their existence. Each lesson in the Teacher's Resource Guide includes: (1) a "Program Overview" that presents background information and brief synopses of the program to be viewed; (2) "Objectives" that provide the teacher with measurement goals; (3) a "Before Viewing Activity" that familiarizes students with the subject and allows them to set purposes for viewing; (4) "Vocabulary" that features definitions of unfamiliar words used in each program; (5) "Discussion Questions" that help students assess the main points of the program; (6) "Suggested Reading" for students who may want to learn more about the topic; and (7) a "Naturalist's Guide" (student worksheet) to be duplicated and distributed to students. The programs highlighted in this guide focus on showing how young animals come of age--how they are nurtured and protected by their families and how they learn to survive and take care of themselves in the wild. Program titles include "Echo of the Elephants," "Jane Goodall's Wild Chimpanzees," "Ghost Bear," "Born to Run," and "Warts and All." (WRM)

TEACHER'S GUIDE

NATURE



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Dear Educator:

Canon U.S.A., Inc. is pleased to be a sponsor of the PBS NATURE series, and to send you this Teacher's Guide.

NATURE brings the wonders of the natural world into our homes in a unique and informative manner. The programs in this guide — "Echo of the Elephants," "Jane Goodall's Wild Chimpanzees," "Ghost Bear," "Born to Run," and "Warts and All" — give you and your students the opportunity to gain new insights into the lives of animals and the work of naturalists. This Teacher's Guide highlights the ways in which very different young animals learn to survive on their own in the wild.

At Canon, we hold the environment in high regard. By teaching students about the natural world, we feel they will develop an appreciation of our world and will be better able to protect it in the years to come.

There is no greater mission than that of the teacher. We trust that this Teacher's Guide will provide you with some tools to make your challenges easier.

We salute your efforts and wish you all the best in preparing our children to better understand our global environment and the people who make up our world.

Sincerely,



H. Murase
President



Alex Trotman
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Dear Educator:

For the second consecutive year, the men and women of Ford Motor Company are proud to bring you this Teacher's Guide for the PBS series NATURE.

This educational series, with its emphasis on wildlife, their habitats and their preservation, as well as the concerns of naturalists, parallels our efforts to protect the environment and to be a responsible automotive company. Our employees have a vision to provide more people in more places with products that will not only raise their standard of living, but will also raise the banner of environmental stewardship.

Preserving the environment is everyone's responsibility. This Teacher's Guide will help our young people to become more keenly aware of our environmental responsibilities and the important issues facing us.

Ford and the more than 300,000 employees who comprise its global team hope you find these materials useful in making the most of NATURE and increasing the environmental awareness of our youth.



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INTRODUCTION

This Teacher's Guide has been developed for use with public television's NATURE series. Hosted by George Page, NATURE tells compelling stories about the lives of animals in their habitats, illuminating the extraordinary diversity of life on Earth. This guide focuses on five NATURE programs that show how young animals come of age — how they are nurtured and protected by their families, and how they learn to survive and take care of themselves in the wild. These documentaries show that the survival of young animals is not only affected by inherited characteristics and by chance, but also by their capacity to learn from their families, from other animals, and from their environments.

Four of these stories focus on the lives of African animals. "Echo of the Elephants" documents an 18-month period during which naturalist Cynthia Moss filmed elephant families at the Amboseli National Park in Kenya. "Jane Goodall's Wild Chimpanzees" shows the daily routines, learning processes, and power struggles of a community of chimpanzees that naturalist Jane Goodall has observed for 35 years. "Warts and All" provides an intimate look at the lives of a warthog mother and her young. "Born to Run" depicts some of the perils faced by young Thomson's gazelles as they attempt to survive on the East African plains. Closer to home, "Ghost Bear" shows the solitary but adventurous life of an unusual "white" black bear that inhabits an isolated island off the coast of British Columbia.

THE EDUCATIONAL MATERIALS

This guide has been designed to help teachers and students use the public television series as a starting point for active participation in the study of nature.

Each lesson in the Teacher's Guide includes:

- a *Program Overview*, which gives a brief synopsis of the program to be viewed;
- *Objectives*, which provide the teacher with measurable goals;
- a *Before Viewing Activity*, which familiarizes students with the subject and allows them to set purposes for viewing;
- *Vocabulary*, which provides definitions of unfamiliar words used in each program;

- *Discussion Questions* that help students assess the main points of the program;
- a *Suggested Reading* for students who may want to learn more about the topic;
- a *Naturalist's Guide* (student worksheet), to be duplicated and distributed to students. This contains activities that encourage students to view the program as a naturalist would in order to gain a better understanding of animals, their habits and habitats, and other factors that affect their existence. The guide encourages family viewing and contains cooperative learning activities.

CREATING A NATURALIST'S DIARY

Naturalists keep diaries to record their observations. In order to complete the activities in this guide, students will need to make their own diaries. Students may set aside part of their science notebook or make a separate booklet for this purpose. Diaries may include news clippings, drawings, photos, maps, charts, and graphs, as well as student worksheets. Students may share their diaries with others or use them to develop a bulletin board display.

PROGRAM SCHEDULING

Programs are scheduled to be broadcast on the dates indicated below. Broadcast dates, however, may vary slightly from area to area. Please check local listings for any scheduling changes.

Program	Broadcast Date
"Echo of the Elephants"	February 25, 1996
"Jane Goodall's Wild Chimpanzees"	March 3, 1996
"Ghost Bear"	March 10, 1996
"Born to Run"	April 7, 1996
"Warts and All"	April 21, 1996

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OBJECTIVES

Students will:

- observe and analyze the survival strategies young elephants learn from their family;
- understand some methods that naturalists use to study animals.

VOCABULARY

You may wish to introduce students to the vocabulary before viewing the program.

bull *noun*: an adult male elephant.

calf *noun*: a young elephant.

herd *noun*: a group of elephants that live and travel together.

instinct *noun*: an inborn pattern of behavior.

matriarch *noun*: a female who is the ruler of an animal family.

migration *verb*: to move annually or seasonally from one location to another in search of food; to go where the weather is better; or to reach breeding or "birthing" areas.

plains *noun*: extensive, fairly level grassland that contains scattered trees and in some areas is home to herds of grazing animals and their predators.

sibling *noun*: brother or sister.

tusking *verb*: the way in which a male elephant rubs his tusks against the ground when he wants to invite another male elephant to playfully fight.

SUGGESTED READING

For students who want to learn more about this topic, suggest the following:

Moss, Cynthia and Martyn Colbeck. *Echo of the Elephants: The Story of an Elephant Family*. New York: William Morrow & Co., 1993.

ECHO OF THE ELEPHANTS

BROADCAST DATE: FEBRUARY 25, 1996

PROGRAM OVERVIEW

Cynthia Moss, a research scientist and conservationist, has devoted over 25 years to studying elephant families in Africa. In an effort to preserve and protect them, Moss has spent much of her life observing these magnificent, complex creatures and recording careful notes about their behavior from just a few feet away.

"Echo of the Elephants" chronicles 18 months in the life of a family of African elephants in the Amboseli National Park in southern Kenya. Echo is the matriarch of a family of elephants. This program follows Echo's family as it migrates from the parched plains to the swampland below Mt. Kilimanjaro. At the start of the program,

Echo gives birth to a calf she had conceived 22 months earlier. At first this calf, named Ely, is unable to straighten his legs and walk properly. Echo and an older daughter assist him — boosting him up by using their trunks. After several difficult days, he learns to walk.

Moss is intrigued by elephants' complex family life and their social systems. She studies elephants' systems of communication, including their use of low-pitched rumbles, which fall below human hearing capacity, and their ebullient trumpeting.

Theme: "Echo of the Elephants" illustrates how young elephants develop and learn survival skills from their close-knit family.

BEFORE VIEWING THE PROGRAM

Introducing the Program

Using a world map or globe, have students locate Kenya, then Mt. Kilimanjaro. Explain that naturalist Cynthia Moss has spent over 25 years studying the elephant families that live in this region. Invite students to recall any firsthand experiences with elephants, such as at the zoo. To help your students appreciate the growth of an elephant, tell them that the average elephant birth weight is about 250 pounds, and that Ely, the newborn elephant featured at the beginning of "Echo of the Elephants," weighed 350 pounds at birth. A full-grown African bull elephant weighs up to 16,500 pounds, and is 25 feet long (including the trunk) and 13 feet high.

Distribute the Naturalist's Guide (student worksheet)

Duplicate and distribute the Naturalist's Guide (student worksheet) to students and preview it with them. As they watch the program, ask students to observe how the young elephants learn survival strategies from Echo and other adult family members. Students can also look for the different ways in which elephants use play behavior to prepare them for adulthood. Encourage them to take notes and make sketches of the elephants and the other animals they observe.

AFTER VIEWING THE PROGRAM

Encourage students to discuss the program and share their observations. The following questions may be used to stimulate discussion.

1. What are some of the survival skills Ely learns from his mother, Echo, during his first 18 months? (Ely learns how to walk; how to use his trunk to drink water; how to dig up roots using his trunk and his feet; how to find water holes during the dry season; and how to use special sounds to communicate with others.)
2. Ely has difficulty walking when he is born. How do Echo and her family react to this? (During Ely's early struggles, the adults were patient and persistent. They stood by his side and offered support until he was able to walk by himself.)
3. What kinds of play behavior help young elephants learn to survive as adults? (Young male elephants pretend to chase and fight other males in the family. One day, this will help these elephants to establish their place in the dominance hierarchy and succeed in mating. Young female elephants help their mother and aunts by "babysitting" for the young.)
4. What are some of the best ways for naturalists to learn about animal behavior? What parts of a naturalist's job might be difficult for you? (Naturalists need to be careful observers and note-takers. They need to be patient, quiet, and nonintrusive. This means that naturalists cannot offer help even if the animals are struggling or starving.)

PROGRAM DATE: _____ TIME: _____ CHANNEL: _____



ECHO OF THE ELEPHANTS

A naturalist observes how newborn animals learn important survival skills from their family.

Complete both activities.

ELY'S LIFE LESSONS

As you observe this program, take notes about the survival strategies that young Ely learns from his mother Echo and the other elephants. For example, how does Ely learn to feed and protect himself? Use this chart to help you keep track of Ely's progress and record the steps involved in learning how to survive. Use clues from the program to predict what Ely will learn later in his life. You may wish to make a sketch of Ely as a newborn (include as much detail as possible).

TO THE FAMILY

You are invited to view NATURE. As you watch the program, look for the various ways elephants teach their young how to survive. After the program, share what you've learned with your family.

FOLLOW ELY'S PROGRESS

Ely's Age	Survival Lesson Learned	Comments
2-3 days	Walking	Walked on knees at first — Echo helped with trunk.
1st week	Drinking	
1st month	Eating grass	
	"Tusking"	Play prepares him for fighting as an adult
About 8 months	Pulling up roots with trunk and feet	



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THROUGH A NATURALIST'S EYES

Find an animal in your neighborhood that you can observe for several weeks. You might select a bird or a squirrel, for example. In a notebook, record your observations, thoughts, and questions about the animal's movements, eating habits, and interactions with other animals. You may want to do some library research about the type of animal you select so that you are better able to understand its behavior.

As Ely learns to stand, his mother's patience and help are critical.

JANE GOODALL'S WILD CHIMPANZEES

BROADCAST: MARCH 3, 1996

OBJECTIVES

Students will:

- observe and describe family and social interactions among a group of chimpanzees;
- examine the ways in which chimpanzees convey complex feelings, needs, and social status with nonverbal gestures;
- observe and understand the importance of the role of the chimpanzee mother in teaching and caring for her young.

VOCABULARY

You may wish to introduce students to the vocabulary before viewing the program.

alpha male *noun*: the dominant male of a group.

termite *noun*: a small, soft-bodied social insect that eats wood.

instinct *noun*: an inborn pattern of behavior.

dominant *adjective*: commands, controls, or leads others.

submissive *adjective*: is led or controlled by others. Opposite of dominant.

primates *noun*: the group (order) of mammals that includes monkeys, apes, and humans.

SUGGESTED READING

For students who want to learn more about this topic, suggest the following:

Goodall, Jane. *In the Shadow of Man*. Boston: Houghton Mifflin Company, 1988.

PROGRAM OVERVIEW

Gombe National Park in Tanzania is an oasis for groups of chimpanzees that continue to thrive while life goes on at a frantic pace outside their immediate environment. In 1960, a young naturalist named Jane Goodall approached them for the first time, and they ran away in terror. She persevered and, after two years, they accepted her presence. Studying the chimpanzees, Jane Goodall's research shed light, for the first time, on the fascinating social and familial interactions of these intelligent and playful creatures.

One of Jane Goodall's original subjects, Fifi, still lives in the forest where they first

met 35 years ago. Fifi is a good mother, having successfully raised six offspring — four males and two females. The two older males, gentle Freud and the aggressive Frodo, vie for the top spot of alpha male. The two younger males, Ferdinand and Faustino, interact on a different level. Fifi is the calm and knowledgeable matriarch of her clan, teaching her youngest sons the important lessons necessary for surviving in the forest.

Theme: "Jane Goodall's Wild Chimpanzees" documents the importance of family interactions in the complex society of the chimpanzees.

BEFORE VIEWING THE PROGRAM

Introducing the Program

Write the following words and phrases on separate slips of paper and place them into a hat or basket:

Yes ■ *That's bad food* ■ *I'm tired* ■ *No*
■ *I'm angry* ■ *I'm excited* ■ *I'm hungry*
■ *I'm sad* ■ *That's funny* ■ *My stomach hurts* ■ *Hello* ■ *I'm happy* ■ *That's good food* ■ *I'm very strong* ■ *Good-bye*

Have the students take turns acting out the words or phrases without speaking. The rest of the class should try to figure out what the students are trying to say. After the exercise, explain that we constantly communicate without words, and that this is an important part of our interactions with other people. Ask the students to brainstorm about how we learn to communicate this way. Our first lessons in nonverbal communication are from our parents and other family members (one of the first gestures a baby learns is how to wave good-bye). Tell the students that as they watch "Jane Goodall's Wild Chimpanzees," they will see many different behaviors exhibited by the chimpanzees, including the communication of feelings and needs without words.

Distribute the Naturalist's Guide (student worksheet)

Duplicate and distribute the Naturalist's Guide (student worksheet) to students and preview it with them. As they watch the

program, students should observe the interactions between the young chimpanzees and their mother and also with other chimps, taking note of the ways in which the animals communicate and behave in different situations.

AFTER VIEWING THE PROGRAM

Encourage students to discuss the program and share their observations. The following questions may be used to stimulate discussion.

1. Fifi is a calm and experienced mother. What does she do to give us this impression? (She calmly watches as her children play. She lets the younger chimps crawl on her and pull her fur. She doesn't interfere with play until it gets out of hand.)
2. What are some of the skills that Ferdinand and Faustino learn by watching Fifi? (How to catch tasty termites, when to eat certain foods and where to find them, and probably which plants to eat for a stomachache.) How are these skills different from instinctive behavior? (Freud and Faustino learn to catch termites through observation, while instinctive behavior is inborn.)
3. Chimpanzees groom each other to remove insects from their coats. What are other purposes of grooming? (To show friendship, to calm the group, to ease tension, to show submission.)

PROGRAM DATE: _____ TIME: _____ CHANNEL: _____



JANE GOODALL'S WILD CHIMPANZEES

A naturalist often examines the ways in which different species care for, feed, and protect their young.

Complete the first activity and one other activity of your choice.

MONKEY BUSINESS

As you view the program, take notes on the different behaviors demonstrated by the chimpanzees. Examine the ways in which young chimps learn to relate to the rest of the chimpanzee group and the ways in which they learn about their environment. After viewing the program, list as many different behaviors as you can; write down how the behavior is learned and how the behavior is useful for chimpanzee society or family life. You may want to use a chart format, as outlined below. Can you think of any human behavior that is similar to the behavior of the chimpanzees?

Behavior	How behavior is learned	How behavior is useful
Fishing for termites	Watching and copying mother	For getting food
Swinging from trees	Play	For acquiring hunting skills
Grooming		
Male "displays"		
Twilight "calls"		
Making nest		

TO THE FAMILY

You are invited to view NATURE. As you watch the program, encourage your youngster to observe the ways in which chimpanzees relate to one another. You should also note the special bond between a mother chimp and her young. After the program, discuss some of the aspects of chimpanzee family life and social interactions.

Young chimps learn grooming from their family and other members of their society.

MAKE A FACE

Jane Goodall observed chimpanzees interacting in the wild; she made note of their facial expressions and what each face conveyed to the other members of the chimpanzee group. Faces can express friendship, happiness, anger, and many other emotions. Ferdinand even made a silly face to try and cheer up an ill Faustino! Working in a group, look for different facial expressions in pictures you find in magazines, cut them out, and paste them on a large piece of paper or poster board. How many different expressions can you find? Are facial expressions important in the ways that families interact?



LIFE LESSONS

Animals are dependent on their families for care, food, and protection for varying lengths of time before they "leave the nest" and try and survive on their own. Most chimpanzees stay with their mothers, riding on the mother's back and nursing for 5 years. In this period of time, they learn through observation how to live, find food, and raise babies of their own. Pick another animal you would like to learn more about. Research the lessons that the young animal has to learn before leaving the protection of its mother. How long does this animal stay with its mother? What does it learn through observation and imitation of its mother and other adult animals? Present your findings to your class.

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OBJECTIVES

Students will:

- identify and describe the skills young bears need to learn to be able to survive on their own;
- examine the social structures of wolf society;
- explore ways people can protect and conserve an isolated island.

VOCABULARY

You may wish to introduce students to the vocabulary before viewing the program.

carnivore *noun*: an animal that feeds primarily on animal flesh.

cub *noun*: a young carnivorous animal, such as a bear or a lion.

dominant *adjective*: ruling, controlling, or most powerful.

fjord *noun*: a deep inlet of the sea shaped by glaciers and often penetrating far inland.

hibernation *noun*: a condition during winter in which certain animals become inactive and their metabolism slows significantly. While bears are often said to hibernate, they are not true hibernators. Their metabolism does not slow down enough. Rather, they become dormant.

hierarchy *noun*: a ranked classification of a group of people or animals based on strength, power, or other characteristics.

pack *noun*: a group of predatory animals that hunt together.

spawn *verb*: to shed large quantities of eggs and sperm directly into the water, as is done by many fishes and mollusks.

submissive *adjective*: obedient, willing to give in to another.

SUGGESTED READING

For students who want to learn more about this topic, suggest the following:

Fair, Jeff. *Great American Bear*. Minocqua, Wis.: NorthWord Press, 1994.

GHOST BEAR

BROADCAST: MARCH 10, 1996

PROGRAM OVERVIEW

On an isolated island off the coast of British Columbia, appearances can be deceiving. For example, about one in ten black bears found on the island are snow white. The result of a recessive gene that all but disappeared on the mainland long ago, these "ghost bears" are neither polar bears nor albinos and they are extremely rare in the rest of the world.

"Ghost Bear" follows the growth and learning experiences of a two-year-old white bear that has just left the safety and protection of its mother. Through observation, practice, and perseverance, this bear learns how to survive. He figures out how to catch

salmon so that he can fortify himself before the long winter hibernation. He overcomes such obstacles as slippery, elusive fish, which are hard to catch, and other larger bears that are intent on stealing his meals.

The program also offers a glimpse of some other animals that share the island and surrounding waters, including grey wolves, bald eagles, and killer whales. Each species has its own instincts, family structures, and social rules.

Theme: In order to survive on its own on an isolated island, the white black bear must observe other animals carefully and must develop its own necessary skills through trial and error.

BEFORE VIEWING THE PROGRAM

Introducing the Program

Show students a photograph of the white black bear profiled in this program (from student worksheet or accompanying poster). Invite them to guess what kind of bear it is. Many students will probably guess that it is a polar bear. Explain that it is a rare type of black bear found on an isolated island in western Canada. Point out that this "ghost bear" has just left the security and guidance of his mother and now must survive on his own.

Distribute the Naturalist's Guide (student worksheet)

Duplicate and distribute the Naturalist's Guide (student worksheet) to students and preview it with them. As they watch the program, encourage your students to watch for survival strategies the young "ghost bear" learns that will enable him to survive in the wild. How does the young bear learn in order to catch a salmon? What are some of his early mistakes? How does he overcome them?

AFTER VIEWING THE PROGRAM

Encourage students to discuss the program and share their observations. The following questions may be used to spark discussion.

1. What kinds of survival skills did the young bear need to learn in order to make it on his own? (Catching fish, gathering other kinds of food, protecting

himself, escaping by climbing up trees, and understanding the social rules of adult bear society.)

2. How did the young bear learn these skills? (He learned by observing older, more experienced bears, including his mother, and by imitating their behavior.)
3. Why does this island have white black bears when there are virtually none on the Canadian mainland? (Because of their isolation, the few bears that started the population on the island thousands of years ago had a great effect on their descendants' appearance. The gene for white fur is recessive in black bears. Their isolation helped to increase the frequency of the gene for white fur in the gene pool.)
4. According to Native American legend, the raven decreed that the white black bear would live forever on this island. But now the lumber industry is starting to move into this isolated area, and the "ghost bears" may soon be in danger. What can people do to ensure that these special bears will continue to live there? (One idea: Write to Canada's leaders to create laws to protect this island's isolation. Students can write to ask for the preservation of this island's creatures at the following address: Office of the Prime Minister, Langevin Block, 80 Wellington Street, Ottawa, ON, K1A 0A3 CANADA.)

PROGRAM DATE: _____ TIME: _____ CHANNEL: _____



GHOST BEAR

A naturalist often analyzes how young animals acquire the skills to survive on their own when they reach adulthood.

Complete the first activity and one other activity of your choice.

THE EDUCATION OF "GHOST BEAR"

To help chronicle key survival skills illustrated in this program, create a calendar entitled "The Growth and Learning of Ghost Bear." For each of the seasons of the year, draw pictures of the young white black bear learning an important lesson. Some moments you might want to include:

- ▶ catching his first salmon
- ▶ climbing a tree to escape danger
- ▶ fending off an older bear intent on stealing a meal from him
- ▶ hibernating in winter.

SUMMER



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After many tries, this young bear has finally caught a fish.

THE WAY OF THE WOLVES

Wolf society has one of the most complex social structures in the animal kingdom. Using resources from your library, create an interesting presentation for your class about the social rules and behaviors young wolf pups learn from adults. Tell your class about the wolf dominance hierarchy and the distinctive communication methods of wolves (such as posture, facial expressions, scent marking, and vocalization).

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TO THE FAMILY

You are invited to view NATURE. As you watch the program, look for the different skills and social rules that the young "ghost bear" learns in order to survive away from its mother. After the program, discuss your observations with your family.

A SALMON'S JOURNEY

According to this program, a salmon's life is "one long round-trip." After all, salmon that live long enough to reproduce eventually die in the same stream where they hatched. To help teach others about the salmon's unusual travels, write a journal of a salmon's lifetime — from the point of view of the salmon. You can have fun with this activity, but make sure you stick to the true facts about this tireless species. Begin your journal in a stream on this island and include the long journey out to the Pacific Ocean. Make sure you mention the salmon's courageous return to the island, and how the salmon swims upstream through powerful currents and past hungry bears.



OBJECTIVES

Students will:

- observe and analyze the role of play in the development of Thomson's gazelles;
- identify strategies that animal parents use to feed, protect, and teach their young.

VOCABULARY

You may wish to introduce students to the vocabulary before viewing the program.

fawn *noun*: the young of a deer or certain other mammals, such as a gazelle.

herd *noun*: a group of animals that lives and travels together.

predator *noun*: an animal that hunts other animals for food.

prey *noun*: an animal that is hunted by another animal.

stotting *verb*: a method used by gazelles to alert each other to danger, involving a giddy bounce on all four legs.

SUGGESTED READING

For students who want to learn more about this topic, suggest the following:

Walther, Fritz R. *In the Country of Gazelles*. Bloomington, Ind.: Indiana University Press, 1994.

BORN TO RUN

BROADCAST: APRIL 7, 1996

PROGRAM OVERVIEW

From the moment a Thomson's gazelle is born, it faces many threats, especially that of swift and powerful predators. But even though the "Tommies" are the preferred meal of many of the carnivores who populate the East African plains, they often escape danger.

"Born to Run" documents the eventful first year of a newborn male gazelle, from his wobbly first steps to his independence from his mother's care. In order to survive, Thomson's gazelles must avoid predators, as well as find food during the drought season. During the arid springtime, the animals of East Africa migrate north in search of fresher pastures.

To survive the hungry predators and harsh conditions, Thomson's gazelles have developed a number of strategies. For example, they gather in large herds, which give them a better chance of spotting predators before they strike. Also, gazelles have an array of signals to alert each other about danger: stamping, snorting, shuddering, and stotting, a giddy bounce on all four legs. Tommies have also acquired the ability to change direction very quickly; this gives them an advantage against even the fastest of predators, such as the cheetah.

Theme: Despite numerous predators and other obstacles, Thomson's gazelles have adapted to their dangerous environment. Young gazelles learn the techniques of survival on the Serengeti by watching adults.

BEFORE VIEWING THE PROGRAM

Introducing the Program

Ask students to use a map to locate Serengeti National Park in Tanzania in East Africa. You might want to compare the Serengeti to Yellowstone National Park in the United States, which has been called "America's Serengeti." Show students a photo of an adult Thomson's gazelle ("Tommy") and explain that this animal — which gets its name from the Arabic word for "affectionate" — is one of the most numerous animals in the Serengeti. To help students appreciate how fast gazelles and cheetahs can run, tell them that for humans, the world record for running 100 meters is about 9.9 seconds (about 23 miles per hour). Explain that most gazelles can cover that same distance in about 4.38 seconds (52 miles per hour). Cheetahs, who eat thousands of young gazelles each season, can run even faster! They are the fastest runners of all mammals.

Distribute the Naturalist's Guide (student worksheet)

Duplicate and distribute the Naturalist's Guide (student worksheet) to students and preview it with them. As students watch the program, invite them to look for the survival strategies that gazelles have developed in order to escape the jaws of predators. Encourage them to take notes and make sketches of the animals that interest them.

AFTER VIEWING THE PROGRAM

Encourage students to discuss the program and share their observations. The following questions may be used to stimulate discussion.

1. What are some qualities that help young gazelles survive? (Rapid speed, agility, and the ability to change directions quickly help gazelles avoid predators. Gazelles know how to hide by staying still in taller grass, and have an elaborate warning system to alert each other of a predator's approach. Fawns' coloration also provides them with camouflage.)
2. How does playful aggression help prepare a young gazelle to survive? (When male gazelles are young, they butt antlers to show strength. This sparring helps determine which males will mate as adults. Since the biggest and strongest males will win the sparring matches, they will also be the ones to father the offspring.)
3. Compare the hunting strategies of the gazelle's predators. (Cheetahs rely on bursts of speed of as much as 60 m.p.h. Jackals hunt in groups, one jackal distracting a mother gazelle, while the others kill her fawn. Crocodiles lie under water, waiting for thirsty gazelles to drink. When hyenas are on the prowl, they pretend to be uninterested in the gazelles. Leopards must rely on ambushing gazelles from short distances.)

PROGRAM DATE: _____ TIME: _____ CHANNEL: _____



BORN TO RUN

Complete the first activity and one other activity of your choice.

A naturalist identifies strategies that animal parents use to feed, protect, and teach their young.

SURVIVAL ON THE SERENGETI

As you view the program, take notes about the different animals that live on the Serengeti. Compare the diets of these animals, as well as their predators (if any) and survival strategies. You may wish to make notes about how each set of "strategies" characterizes one species, and how the species' survival strategies change depending on the season and location. Discuss your observations with your class.

As you view the program, take notes about the different animals that live on the Serengeti. Compare the diets of these animals,

TO THE FAMILY

You are invited to view NATURE. As you watch the program, compare the survival strategies of gazelles and cheetahs. After the program, discuss your observations with your family.

Animal	Diet	Predators	Survival Skills
Thomson's gazelle ("Tommy")			
Cheetah			
Jackal			
Wildebeest			

FASTER THAN A SPEEDING BULLET

This program features a number of animals that can run much faster than humans. Using the information in this program, as well as library resources, create a book that features the world's fastest animals. These animals include cheetahs, peregrine falcons, pronghorn antelopes, and killer whales. Write about how their speed helps them capture their prey and/or escape from their predators. If interested, you could then create a book about the slowest creatures in the world.



© Steve Turner/Animals Animals

THE YOUNG TOMMIES

Play prepares young Thomson's gazelles for adult jousts.

With a group, create a mural that illustrates the first year in the life of a Thomson's gazelle. Include its ability to adapt to different environmental conditions, such as drought season, and its survival skills against its powerful predators. At the library, find out approximately how many gazelles are born each year, and how many survive.

OBJECTIVES

Students will:

- understand the ways in which warthogs have adapted to survive in a harsh environment;
- observe and analyze the interactions of warthogs with their neighbors, including predators and other warthogs.

VOCABULARY

You may wish to introduce students to the vocabulary before viewing the program.

drought *noun*: prolonged dry weather that leads to a shortage of water.

communal *adjective*: a way of living in which all members contribute to the common good.

maternal *adjective*: coming from or related to motherhood.

predator *noun*: an animal that hunts other animals for food.

scavenger *noun*: a living thing that feeds on dead animals or food left by other animals.

omnivore *noun*: an animal that feeds on both meat and vegetation.

SUGGESTED READING

For students who want to learn more about this topic, suggest the following:

Harbrecht, Doug. "Beauty or the Beast." *International Wildlife*, No. 22 (July/August, 1992): pp. 30-36.

WARTS AND ALL

BROADCAST: APRIL 21, 1996

PROGRAM OVERVIEW

Of all the animals that inhabit East Africa, warthogs receive very little attention, though they are tough, loyal, and clever. Characterized by long flattened snouts, facial warts, and long, sharp tusks, warthogs have been able to survive and thrive in a potentially dangerous environment for millions of years. The warthog family is communal; several warthog females, including young female yearlings, work together to raise the young piglets. Warthog mothers herd their young warthogs, constantly protecting them from predators and other dangers on the plains.

Warthogs have adapted well to the rigors of living in the wilds of Africa. Most warthogs

can avoid predators through their speed and vigilance, and warthog mothers are formidable adversaries when it comes to animals stalking their piglets. Warthogs also use their powerful snouts to forage for food and dig for water while other species languish during a drought.

This episode of NATURE follows three generations of warthog mothers in Lake Nakuru National Park over the course of one year. "Warts and All" explores the adaptations that enable warthogs to survive in this harsh, beautiful part of Africa.

Theme: This program demonstrates how warthog families nurture and protect their young so that they can grow and learn to survive on their own.

BEFORE VIEWING THE PROGRAM

Introducing the Program

Show the students a picture of a warthog. Ask the students what they think it is, where it might live, and what it might eat. Also point out the tusks, the large warts below the eyes and above the tusks, and the long, flattened snouts. Have the students hypothesize as to the nature of the animal and the purpose of its features. List ideas on a large piece of paper or a chalkboard before viewing the program so that they can be compared to what is learned in viewing the program.

Point out that young animals that live in the wild have much to learn from their elders so that they can grow up and live on their own. Ask the students what living organisms need to live. Food and shelter are some examples. Tell the students that the program they are about to view, "Warts and All," follows the experiences of a family of warthogs after the birth of a new litter of piglets; students will observe young warthogs struggling and learning to survive to adulthood.

Distribute the Naturalist's Guide (student worksheet)

Duplicate and distribute the Naturalist's Guide (student worksheet) to students and

preview it with them. As they watch the program, students should note the dangers that young warthogs face. They should consider the survival skills that young warthogs learn by watching their mothers, playing, and interacting with other animals.

AFTER VIEWING THE PROGRAM

1. What is meant by the term "maternal instinct"? List examples from the program. (The exhausted warthog mother nursing her young; the jackal mothers hunting for their pups; the waterbuck mother protecting her fawn from an older animal.)
2. Which newborn animals in the episode had to learn how to walk immediately? (Giraffes and waterbucks). Why do they need to be able to walk right away? (To avoid predators.)
3. Why do warthogs have an advantage over grazers in a drought? (They are omnivorous, and can eat meat as well as grasses. They also have strong snouts that allow them to dig up water, roots, and bulbs.)
4. Why do scavengers such as hyenas and tawny eagles thrive in a drought situation? (Because many animals die from lack of water, leaving the scavengers plenty to eat.)

PROGRAM DATE: _____ TIME: _____ CHANNEL: _____



WARTS AND ALL

A naturalist often examines the family interactions of different species.

Complete the first activity and one other activity of your choice.

A YEAR IN THE LIFE...

When a new litter of piglets is born, a new cycle of learning and growing begins in the warthog community. The timeline below shows the first year of a warthog's life. For each event on the timeline, select one of the skills from the list below that a young warthog might have to learn in order to survive. Note how the mother warthogs help the young warthogs learn about their world. For example, in attacks by jackals, the mother warthogs work together to keep the jackals away from their piglets. The piglets learn (by watching) how to work together to protect their own young someday.

- 1 Learning agility, social skills, how to be aggressive
- 2 Finding food and water without mothers' help
- 3 Seeing mothers work together for protection
- 4 Nursing from mother
- 5 Finding their way home instinctively and by recognizing mother's grunts
- 6 Getting shelter, food, and avoiding predators
- 7 Grubbing up food, scavenging, staying cool, and digging up water



© G. C. Kelley/Photo Researchers

A young warthog drinks water with its mother.

ODE TO A WARTHOG

The narrator in "Warts and All" said that the warthog is a star. What are the special traits and characteristics that make warthogs special? What is unique about the way they raise their young piglets? Do you think that they are loyal, resourceful, and clever? Write a poem in tribute to the warthog. Keep in mind that warthogs have survived, flourished, raised their young, and played on the plains of Africa for millions of years.

MOTHERS AND OTHER HEROES

Female warthogs feed, care for, and protect their young. Young warthogs also learn about their environment by watching the older females. They learn where to get food, which predators pose a threat, and how to raise their own young when they get older. Write an essay or a short story about an important adult woman (mother, grandmother or other relative, teacher, or friend) in your life who has taught you an important life lesson or survival skill.

VIDEO ORDERING INFORMATION

The following NATURE programs featured in this guide are available on videocassette.

- "Echo of the Elephants"
- "Jane Goodall's Wild Chimpanzees" (available March 1996)
- "Ghost Bear"
- "Born to Run" (available April 1996)

To order, write to WNET Video Distribution,
P.O. Box 2284, South Burlington, Vermont 05407-2284.
Please specify program title.

NATURE 1996

Spring Schedule (check local listings)

Program	Broadcast Date
"Echo of the Elephants"	February 25, 1996
"Jane Goodall's Wild Chimpanzees"	March 3, 1996
"Ghost Bear"	March 10, 1996
"The Emerald Isle"	March 17, 1996
"A Wolf in the Fold"	March 24, 1996
"Victims of Venom"	March 31, 1996
"Born to Run"	April 7, 1996
"In the Lion's Den with Anthony Hopkins"	April 14, 1996
"Warts and All"	April 21, 1996
"Lost World of the Medusae"	April 28, 1996
"The Call of Kakadu"	May 5, 1996
"Monsoon"	May 12, 1996
"Fire Bird"	May 19, 1996
"Phantom of the Forest"	May 26, 1996
"The Nature of Sex I — The Primal Instinct"	June 2, 1996
"The Nature of Sex II — A Time and a Place"	June 9, 1996
"The Nature of Sex III — The Sex Contract"	June 16, 1996
"The Nature of Sex IV — Sex and the Human Animal"	June 23, 1996
"The Nature of Sex V — A Miracle in the Making"	June 30, 1996

Look for more information about NATURE on Thirteen/WNET's home page on the Internet's World Wide Web (address: <http://www.wnet.org>).

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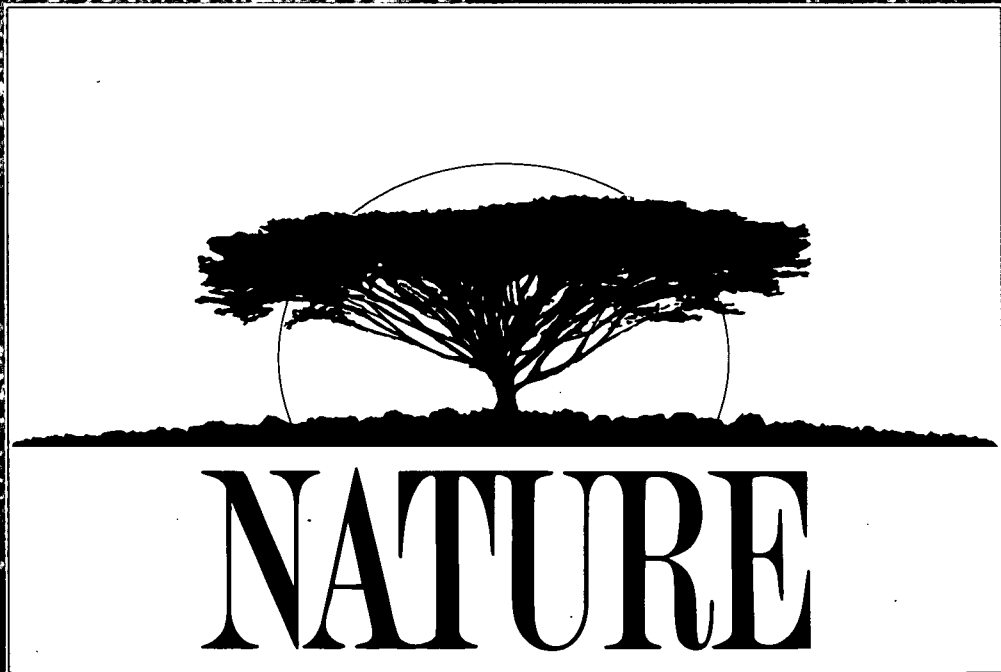
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