

**TEACHER'S SUPPORT MATERIAL**  
to accompany

**Elephas Maximus:**  
**The Biology and Conservation of the Asian Elephant**

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N.B.: All of the enclosed support material is available for download as an msword-doc or as a pdf-file at  
[www.conservenature.org](http://www.conservenature.org).

**Introduction:** The following material is designed to enhance and reinforce the topics discussed in the documentary *Elephas maximus*. These materials are intended for use with students in grades seven through ten. These activities are designed to provide students with greater understanding and increased respect for Asian Elephants. Students will also develop an appreciation of the importance of wildlife conservation. You are invited to use some or all of these materials in your classroom.

**Topics covered in this documentary:**

- |                      |                     |
|----------------------|---------------------|
| 1. Ecology           | 5. Physiology       |
| 2. Evolution         | 6. Captive breeding |
| 3. Social structure  | 7. Farming          |
| 4. Land preservation | 8. Ivory trade      |

**Alignment to New York State Standards:**

Activities will help students reach the following Living Environment Curriculum Standards:

Standard 4: The Living Environment

Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

Performance Indicator 1.1

Explain how diversity within ecosystems relates to the stability of ecosystems.

Performance Indicator 3.1

Explain the mechanisms and patterns of evolution.

Performance Indicator 6.1 (d, e, f)

Explain factors that limit growth of individuals and populations.

Performance Indicator 6.2

Explain the importance of preserving diversity of species and habitats.

Performance Indicator 6.3

Explain how environments change over time and respond to disturbances.

Performance Indicator 7.1

Describe human relationships with the living and nonliving environment.

Performance Indicator 7.3

Explain how individual choices and societal actions can contribute to improving the environment.

**DVD Synopsis:** Filmed on location in Sri Lanka, this is the story of *Elephas maximus*, the magnificent Asian Elephant. It is the story of this animal's dependence on plants and on the land that supports them. The Asian Elephant faces many challenges. But people everywhere are beginning to show a willingness to preserve wild spaces for elephants. Our message is, if we all work together, the future will be one in which our own grandchildren will share the planet with future generations of these wonderful elephants.

(running time 32 mins, plus 2 min bonus feature)

## **Lesson 1: View the Elephas maximus Video**

**Time Required:** 1 class period (1 period is approximately 42 minutes)

**Materials:** Television, DVD player, or computer with DVD and projector, *Elephas maximus* DVD, Note Outlines for students (enclosed).

**Objectives:** The students should be able to recognize the importance of conservation and complete the note outline from the video.

**Anticipatory Set:** The teacher will ask the students: What does the term conservation mean? Why is conservation important? What are some animals that benefit from our conservation efforts? Use the Asian elephant as an example of a species that humans should try to protect.

**Input:** The teacher should describe the background of the documentary. Explain how to complete the note outline sheets during the video. The students will then watch the documentary.

**Guided Practice:** The teacher will play the 32-minute documentary. After playing the documentary the teacher will ask the students to think of one thing that they learned from the video. The teacher will call on students to share what they learned with the class. The teacher can use an overhead to help students complete the note outline sheet.

**Independent Practice:** In approximately 150 words, the students will write a response to the question: What can I do to help conserve the environment?

**Check for Understanding/Closure:** The teacher can ask the students: why is conservation important in all of our lives? The teacher should circulate through the room and check to see if the note outlines have been completed.

**Alignment to NYS Curriculum:** Standards 4.1.1, 4.3.1, 4.6.1, 4.6.2, 4.6.3, 4.7.1, 4.7.3

## **Lesson 2: The Importance of Wildlife Conservation**

**Time Required:** 1 (or 2) periods

**Materials:** Copies of the Case Study Worksheet Packet (enclosed).

**Objectives:** Students should be able to explain the importance of wildlife conservation on a global scale and also as it pertains to their own lives.

**Anticipatory Set:** The teacher will introduce the lesson by asking if the students are familiar with what a role playing activity is. The teacher will give an overview of what this role playing activity will entail.

**Input:** The students will work in cooperative learning groups with 3-4 students per group. The teacher will explain the directions of the activity and then assign students to their groups. The groups will be assigned specific roles as: Farmers, Environmentalists, Educators, Private Citizens, Animal Handlers, Businessmen, Land Developers, and Politicians. Within their groups, students will assign roles for a recorder, reporter, task master, and materials manager. Students will read the Case Study in their groups. As a group, students will investigate the role that their group has been assigned and develop an argument supporting their position. The students will use the questions on the Case Study Worksheet as a guide for their argument. One student from the group will be responsible for presenting their argument to the “Judge” during the trial. The teacher will play the role of the Judge.

**Guided Practice:** The teacher will circulate through the room while the students are working in their groups. The teacher will check the progress of each group and make sure that they are on the right track with their arguments. The reporters will present their groups’ arguments to the class during the trial. The teacher will ask the reporters questions that they were required to answer from the Case Study Worksheet. While the reporters are presenting, the students will take notes by completing their charts attached to the Case Study Worksheet.

**Independent Practice:** For homework, in a written essay, students will express their personal opinions on whether the land discussed in this particular case should be developed. In their essays the students will answer the question; why is wildlife conservation important?

**Check for Understanding/Closure:** The teacher will ask different students to summarize the opinions of each person interviewed for the trial. The students will have a chance to correct their charts that they were taking notes in during the trial. The teacher will describe the decision and explain how the decision was determined. The teacher will collect the Case Study Worksheet Packet.

**Alignment to NYS Curriculum:** Standards 4.1.1, 4.6.1, 4.6.2, 4.6.3, 4.7.1, 4.7.3

## **Lesson 3: Elephant Adaptations**

**Time Required:** 1 period

**Materials:** Overhead projector with blank transparencies and overhead marker (or front board with chalk), overhead or poster of an Asian Elephant, overhead or poster of phylogenetic tree, construction paper for students, markers.

**Objectives:** Students should be able to list three adaptations that Asian Elephants have acquired and explain how these traits are advantageous while relating the adaptations to evolution.

**Anticipatory Set:** The teacher should ask the students to name elephant traits (physical and behavioral). The teacher will record the student responses in a list on the overhead or front board.

**Input:** The teacher will display the picture of an Asian Elephant and lead a class discussion about Asian elephant morphological traits. The teacher will also have the students discuss behavioral traits. The teacher will ask questions such as: How do these morphological and behavioral traits enhance the elephant's life? The teacher will use the overhead projector to organize the student responses into a chart of Traits and their Advantages. Once completing the chart the teacher will ask the students: What is evolution? The teacher will describe the process of evolution. The teacher will also discuss the phylogenetic tree and explain where Asian elephants are classified.

**Guided Practice:** The students will copy the chart of Traits and Advantages from the overhead projector into their notes.

**Independent Practice:** The students will use their imaginations to predict what elephants will look like 10 million years from now. The students will draw their imagined organisms on construction paper. The students will have to provide the following: What is the name of the new organism that they predict will descend from modern elephants in the future? What will be the organism's habitat? What are the adaptations that this organism has made to thrive in its habitat? How did this organism develop these adaptations? Describe the process of evolution that occurred. The drawings and explanations can be finished as homework.

**Check for Understanding/Closure:** The teacher will reinforce the concept that evolution is a process that takes enormous time to occur.

**Alignment to NYS Curriculum:** Standards 4.3.1, 4.6.3

## **Lesson 4: Two Types of Elephants**

**Time Required:** 1 period

**Materials:** Note outlines from video, overhead projector, transparencies of note outlines, transparencies of 2 types of elephants, rulers, markers and blank paper for the students.

**Objectives:** The students should be able to describe the differences between African and Asian Elephants in a chart and with illustrations.

**Input:** The teacher will complete the note sheets from the video. The teacher will explain that there are two types of elephants living today, Asian and African elephants. The teacher will explain how the students will be constructing a chart to include the similarities and differences between Asian and African elephants. The teacher will display an overhead of each type of elephant.

**Guided Practice:** The students will use the rulers and paper to construct their own individual charts. The students will supply answers and the teacher will write the answers in the appropriate column on the overhead.

**Independent Practice:** The students will work independently to draw their own pictures of the elephants in the appropriate column in their notes.

**Check for Understanding/Closure:** The teacher will randomly call on students to describe and share their illustrations with the class. The note outlines and charts/drawings will be collected.

**Alignment to NYS Curriculum:** Standards 4.6.2, 4.7.1

## Note Outline for Elephas maximus Video

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

**Directions:** Fill in the blanks while watching the video.

### **Proboscidae:**

-An elephant's trunk is an extremely elongated \_\_\_\_\_.

### **The Two Types of Elephants are:**

1. \_\_\_\_\_

2. \_\_\_\_\_

-Their Evolutionary lines have been separate for \_\_\_\_\_ million years.

### **Asian Elephant Characteristics**

1. Adult elephants can weigh up to \_\_\_\_\_ pounds.
2. Elephants live for approximately \_\_\_\_\_ years.
3. Asian elephants do not have visible \_\_\_\_\_.
4. Tusks are enormous \_\_\_\_\_.
5. Elephant molars are very large to help eat \_\_\_\_\_.
6. Grow new teeth \_\_\_\_\_ times through their life.
7. This is an adaptation to allow elephants to live very long \_\_\_\_\_.
8. Elephants live in warm areas of the world. This means that they are a \_\_\_\_\_ species.
9. Each elephant needs approximately \_\_\_\_\_ of water every day.

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

10. Elephants bathe in the water for three reasons: \_\_\_\_\_,  
\_\_\_\_\_, and \_\_\_\_\_.
11. Elephants can use their trunks like \_\_\_\_\_ in the water.
12. In terms of \_\_\_\_\_, elephants are the dominant life form in Asia.
13. Biomass equals the number of \_\_\_\_\_ multiplied by  
their body weight.
14. Each elephant eats 300 pounds of \_\_\_\_\_ every day.
15. Elephants eat \_\_\_\_\_, which they pound with their trunks to  
remove the dirt.
16. Beneficial \_\_\_\_\_ produce necessary enzymes in their  
digestive system.
17. Elephants need a minimal amount of \_\_\_\_\_ in their diets.
18. Elephants also need other nutrients in their diets like  
\_\_\_\_\_ and \_\_\_\_\_.
19. Elephant family groups may move about \_\_\_\_\_ miles per day and  
may eat over one hundred different species of \_\_\_\_\_ per day.
20. Older adult elephants pass knowledge about where to find certain plants to  
their \_\_\_\_\_.

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

21. Elephants sometimes eat farmers' \_\_\_\_\_.

22. Farmers watch their fields and set off \_\_\_\_\_ to try to scare elephants away from their crops, but this doesn't always work.

### **Human Impacts**

23. Farmers are sometimes forced to \_\_\_\_\_ elephants so that they don't destroy their farms.

24. The increase in human \_\_\_\_\_ is the number one wildlife conservation issue.

25. In the past 100 years, the human population in Asia has increased from \_\_\_\_\_ to \_\_\_\_\_ people .

26. In the same century (100 years), the elephant population has plummeted from \_\_\_\_\_ to 40,000 elephants.

27. Thus, more \_\_\_\_\_ is equated with fewer \_\_\_\_\_.

28. Elephant populations are now \_\_\_\_\_ from each other making it difficult for \_\_\_\_\_.

29. Large \_\_\_\_\_ are necessary to preserve elephants.

30. Sri Lanka has an extensive system of National Parks, which were once \_\_\_\_\_.

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

31. Wildlife conservation can be successful. Humans just need to set aside \_\_\_\_\_ as nature preserves.

**Behavior**

32. In an elephant herd, the oldest female is the leader. She is called the \_\_\_\_\_.

33. Three generations of elephants may exist in the herd at the same time: young elephants, their mothers, and their \_\_\_\_\_.

34. Calves nurse with their \_\_\_\_\_ (not their trunks).  
When they are about one year old they start to nibble on plants, but they continue to nurse until they are \_\_\_\_\_ years old.

35. Baby elephants are called \_\_\_\_\_.

36. Baby elephants have close bonds with their \_\_\_\_\_.

37. Female elephants stay together for their \_\_\_\_\_.

38. When an adolescent male elephant reaches puberty around the age of 12, he is \_\_\_\_\_ from the herd.

39. Adult male elephants are \_\_\_\_\_ by nature. That is, they live alone.

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

### **Reproduction**

40. Musth is when the testosterone level of a bull elephant \_\_\_\_\_, and they will pick a \_\_\_\_\_ with any other bull elephant.
41. Each elephant's musth period is not synchronized with \_\_\_\_\_.
42. Bull elephants will breed even if not in \_\_\_\_\_.
43. Female elephants can only become \_\_\_\_\_ following the second LH surge in their hormonal cycle.
44. It is difficult to breed elephants in \_\_\_\_\_.
45. Breeding in captivity is less successful than in the \_\_\_\_\_.
46. Elephants are very \_\_\_\_\_ reproducers.
47. The elephants gestation period is \_\_\_\_\_ long.
48. Following birth, babies nurse for approximately \_\_\_\_\_.
49. Elephants can only have one baby every \_\_\_\_\_ years.
50. Elephants have the slowest \_\_\_\_\_ rate of any animal.
51. The closer we bring captive conditions to those of the wild, the more \_\_\_\_\_ captive breeding will be for elephants.

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

### **Ivory Trade**

52. Direct killing of elephants by poachers is done to obtain their \_\_\_\_\_.

53. There remains a market for elephant tusks because ivory is used in \_\_\_\_\_.

54. \_\_\_\_\_ remains the number one cause of death of elephants.

55. Humans have caused artificial selection of \_\_\_\_\_ male elephants because those males have a better chance to survive than males with \_\_\_\_\_.

56. If people stop buying \_\_\_\_\_ then elephants will not be killed for their tusks.

### **Conservation**

57. If we want to conserve elephants, then we should spread the word about the \_\_\_\_\_.

58. It is important for all of us to develop an appreciation for the natural environment and continue to make efforts to \_\_\_\_\_ wild animals. If we all work together, we can make the world a \_\_\_\_\_ place.

**Note Outline for Elephas maximus Video**  
**Completed Form for Teacher Use**

**Proboscidae:**

-An elephant's trunk is an extremely elongated UPPER LIP.

**The Two Types of Elephants are:**

1. AFRICAN
2. ASIAN

-Their Evolutionary lines have been separate for FIVE million years.

**Asian Elephant Characteristics**

1. Adults can weigh up to 6000 pounds.
2. Live for approximately 60 years.
3. Asian elephants do not have visible TUSKS.
4. Tusks are enormous TEETH.
5. Elephant molars are very large to help eat CORSE VEGETATION.
6. Grow new teeth FIVE times through their life.
7. This is an adaptation to allow elephants to live very long LIVES.
8. Elephants live in warm areas of the world. This means that they are a TROPICAL species.
9. Each elephant needs approximately 40 GALLONS of water every day.
10. Elephants bathe in the water for three reasons: SKIN CARE, TO COOL OFF, and TO HAVE FUN.
11. Elephants can use their trunks like SNORKLES in the water.
12. In terms of BIOMASS, elephants are the dominant life form in Asia.
13. Biomass equals the number of INDIVIDUALS multiplied by their body weight.
14. Each elephant eats 300 pounds of PLANT MATERIAL every day.

15. Elephants eat GRASSES, which they pound with their trunks to remove the dirt.
16. Beneficial BACTERIA produce necessary enzymes in their digestive system.
17. Elephants need a minimal amount of PROTEIN in their diets.
18. Elephants also need other nutrients in their diets like CALCIUM and MAGNESIUM.
19. Elephant family groups may move about TEN miles per day and may eat over one hundred different species of PLANTS per day.
20. Older adult elephants pass knowledge about where to find certain plants to their YOUNG.
21. Elephants sometimes eat farmers' CROPS.
22. Farmers watch their fields and set off FIRECRACKERS to try to scare elephants away from their crops, but this doesn't always work.

### **Human Impacts**

23. Farmers are sometimes forced to SHOOT elephants so that they don't destroy their farms.
24. The increase in human POPULATION is the number one wildlife conservation issue.
25. In the past 100 years, the human population in Asia has increased from 500 MILLION to 2.5 BILLION people .
26. In the same century (100 years), the elephant population has plummeted from 1.5 MILLION to 40,000 elephants.
27. Thus, more PEOPLE is equated with fewer ELEPHANTS.
28. Elephant populations are now ISOLATED from each other making it difficult for INTERBREEDING.
29. Large nature RESERVES are necessary to preserve elephants.

30. Sri Lanka has an extensive system of National Parks, which were once HUNTING RESERVES.

31. Wildlife conservation can be successful. Humans just need to set aside LARGE TRACTS OF LAND as nature preserves.

### **Behavior**

32. In an elephant herd, the oldest female is the leader. She is called the MATRIARCH.

33. Three generations of elephants may exist in the herd at the same time: young elephants, their mothers, and their GRANDMOTHERS.

34. Calves nurse with their MOUTHS (not their trunks). When they are about one year old they start to nibble on plants, but they continue to nurse until they are TWO or THREE years old.

35. Baby elephants are called CALVES.

36. Baby elephants have close bonds with their MOTHERS.

37. Female elephants stay together for their ENTIRE LIVES.

38. When an adolescent male elephant reaches puberty around the age of 12, he is CHASED AWAY from the herd.

39. Adult male elephants are SOLITARY by nature. That is, they live alone.

### **Reproduction**

40. Musth is when the testosterone level of a bull elephant RISES, and they will pick a FIGHT with any other bull elephant.

41. Each elephant's musth period is not synchronized with OTHER BULL ELEPHANTS.

42. Bull elephants will breed even if not in MUSTH.

43. Female elephants can only become PREGNANT following the second LH surge in their hormonal cycle.

44. It is difficult to breed elephants in CAPTIVITY.
45. Breeding in captivity is less successful than in the WILD.
46. Elephants are very SLOW reproducers.
47. The elephants gestation period is 22 MONTHS long.
48. Following birth, babies nurse for approximately 22 MONTHS.
49. Elephants can only have one baby every FOUR years.
50. Elephants have the slowest REPRODUCTION rate of any animal.
51. The closer we bring captive conditions to those of the wild, the more SUCCESSFUL captive breeding will be for elephants.

### **Ivory Trade**

52. Direct killing of elephants by poachers is done to obtain their TUSKS.
53. There remains a market for elephant tusks because ivory is used in ART.
54. POACHING remains the number one cause of death of elephants.
55. Humans have caused artificial selection of TUSK-LESS male elephants because those males have a better chance to survive than males with TUSKS.
56. If people stop buying IVORY then elephants will not be killed for their tusks.

### **Conservation**

57. If we want to conserve elephants, then we should spread the word about the IVORY TRADE.
58. It is important for all of us to develop an appreciation for the natural environment and continue to make efforts to PROTECT wild animals. If we all work together, we can make the world a BETTER place.

## **Case Study Exercise following Elephas maximus Video**

### **Wildlife Conservation Case Study**

**Directions:** Read the following passage. Answer the questions from the point of view of your group's assigned role. Discuss your answers with your group.

**Case Study:** Consider the following scenario:

The government of Sri Lanka is trying to decide whether a section of Wilpattu National Park should be developed as a new eco-tourism resort. If approved this new resort would be built on presently undeveloped land within the park. Wilpattu National Park is one of the largest preserves in Sri Lanka, encompassing a total of 425 square miles of land. The proposed eco-tourism resort would mean that 3 square miles would be 'developed'— in other words altered for human use as roads, parking lots, hotels, restaurants, kitchens, laundry facilities, and shops.

The undeveloped land is presently a tropical area with lush vegetation. The land is known to be the habitat for Asian elephants and many other species of wildlife. Therefore, if the proposal is approved, the land available for wildlife will be reduced.

The resort area that would be built would help the citizens of the nearby city to develop their eco-tourism industry. Many of the people in this area live in poverty and the jobs created by the new resort will unquestionably improve their economy. The advocates of the resort point out that loss of habitat would be trivial (only 3 square miles out of 425 total square miles in the park). Even more significantly, they argue that bringing tourists to appreciate their wildlife will definitely benefit overall conservation efforts in two ways. Local people will come to see the wildlife as a valuable resource for their incomes, and the tourists will go home motivated to contribute to wildlife conservation that they better appreciate.

**The question is straightforward:**

Should the land be developed for the new resort, or should it remain preserved as part of the overall wildlife conservation area?

## Elephas maximus Conservation Case Study Worksheet

**Student Names:** \_\_\_\_\_

**Our Group's Role:** \_\_\_\_\_

**Questions for Presentation:** Answer the following questions from the perspective of your assigned role in the case. Your group will be presenting your answers to these questions in front of the class.

1. What is your group's perspective on what will happen if the land is developed?
2. What is your group's perspective on the benefit if the land is developed?
3. Your group's perspective on the consequences of leaving the land wild?
4. Your view of probable long-term effects (20 years from now) if the land is developed, or not developed?
5. From the perspective of your assigned role, should the land be developed?  
Why or why not?
6. Do you believe there is a best solution to this question?

## Elephas maximus

### Conservation Case Study Take Home Essay

**Directions:** Answer all of the following questions in an organized essay of at least 200 words. This is to be completed from your *personal perspective* (not that of your group's previously assigned role).

-First, explain your personal opinion whether the land in the case study should be developed for human use, or if it should be conserved for wildlife. Explain how you came to that opinion.

-Describe why you think it is important to conserve Asian elephants, or why you do not think it is important.

-Finally, describe what you can personally do to protect Asian elephants.

Most importantly, describe what you WILL do.

## Essay Question Bank for *Elephas maximus* Video

Teachers:

The following questions can be used in a review/reinforcement activity or in a written assessment.

*Elephas maximum* Questions:

1. List the differences between Asian elephants and African elephants.
2. Draw an Asian and an African elephant and explain your drawings in complete sentences.
3. Describe and explain two adaptations of elephants.
4. Imagine that you had a trunk like an elephant. How would you use your trunk in your everyday life?
5. Explain the social structure of an elephant family.
6. If you saw a group of elephants together in their natural environment would they be male or female? How would you know?
7. What happens when a male elephant reaches adolescence?
8. If you were an Asian elephant, would you rather be a male or a female? Explain why.
9. Why do elephants like the water?
10. Why do humans kill elephants?
11. Why are elephants killed for their tusks?
12. How can we protect elephants from poachers (humans who kill elephants for their ivory)?
13. Describe the relationship between the human population and the population of Asian Elephants.
14. If you were a farmer in Sri Lanka how would you protect your crops from elephant destruction?
15. Why should elephants be protected?
16. Why do elephants need a large space to live?
17. Name and explain the ways in which humans affect elephants.