TEACHER'S SUPPORT MATERIAL

to accompany

Forest Secrets: Science and Soul

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Contents:

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

Introduction: The following material is designed to enhance and reinforce the topics discussed in the documentary *Forest Secrets: Science and Soul*. These materials are intended for use with students in grades seven through ten. The activities are designed to provide students with greater understanding and increased respect for the forests of the world. Students will also develop an appreciation of the importance of responsible consumerism in regard to paper and wood products. You are invited to use some or all of these materials in your classroom.

Topics Covered in the Documentary:

1. INTRODUCTION
2. TYPES OF FORESTS
3. ENORMOUS TIME SCALE
4. THE SOIL LAYER
5. THE FOREST FLOOR
6. THE SHRUB LAYER
7. THE UNDERSTORY
8. THE CANOPY
9. BEAUTY
10. THE FOREST AT NIGHT
11. STAND AND FIGHT LIFESTYLE
12. PINE BARK BEETLES
13. WIND
14. FIRE
15. CLIMATE MODERATION
16. CARBON SEQUESTRATION
17. OXYGEN PRODUCTION
18. CLOSING
19. CREDITS

DVD Synopsis: From outer space, our planet looks like a giant blue marble. But it is a marble that is also washed in green. From the forest floor to the canopy, and from the tropics to the taiga, this film celebrates the marvelous ecosystems that make up the world's great forests. They moderate our climates, sequester our carbon, and recharge our atmosphere. They envelope the earth, and we should be so grateful it is so. Filmed on location in Carara National Park, Monteverde Could Forest, Pacific Rim National Park, Rocky Mountain National Park, Algonquin Provincial Park, Iroquois National Wildlife Refuge, Manu National park, LaPalapa Ecolodge, and the Buffalo Zoological Gardens, this film facilitates a deeper understanding of the forests and promotes the students to develop a love of forests. (Running time 51 minutes)

Lesson 1: View the Forest Secrets Video

Time Required: One class period (51 minutes).

Materials: DVD player and TV/Projector, *Forest Secrets: Science and Soul* DVD, Notes Outline for students (enclosed).

Objectives: The students should be able to recognize the importance of forests. They should complete the Notes Outline.

Anticipatory Set: The teacher will ask the students: What makes up a forest? What are some different types of forests? How are forests good for the environment?

Input: The teacher should describe the background of the documentary. Explain how to complete the Notes Outline sheet during the video. The students will then watch the documentary.

Guided Practice: The teacher will play the 51-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 the students complete the Notes Outline sheets.

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

Check for understanding/Closure: The teacher can ask the students: Why are forest important to our lives? The teacher should circulate through the room and check to see if the Notes Outline have been completed.

Lesson 2: Types of Forests

Time Required: One Period

Materials: Notes Outline from video, overhead projector, photographs / Power Point presentation of the major types of forests (rainforests, montane forest, cloud forest, hardwood forest, taiga), rulers, markers, blank paper for the students, (alternatively, the teacher may wish to use the sample chart enclosed below).

Objectives: The students should be able to describe the differences between the major types of forests (rainforests, montane forest, cloud forest, hardwood forest, and taiga) in a chart and with illustrations.

Input: The teacher will help the students complete their Notes Outline from the video. The teacher will explain that there are many types of forests. The teacher will explain how the students will be constructing a chart to include the similarities and differences between the major types of forests. The teacher will display an overhead projection of each major type of forest.

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 / sketches of the forests 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 Notes Outline and charts/drawings will be collected.

Type of Forest	Location(s)	Characteristics: (May apply to more than one forest type)

Lesson 3: Forest Layers

Time Required: One Period

Materials: Notes Outline from video, overhead projector, photographs / Power Point presentation, blank paper for the students, teacher answer bank (enclosed below).

Objectives: The students should be able to distinguish between the five layers of the forest and describe three main characteristics of each forest layer.

Input: The teacher will explain that there are five layers of the forest. The teacher will explain how the students will be constructing an outline that will include each layer and three distinguishing characteristics of each layer. The teacher will display an overhead projection of each major type of forest. The teacher may use the characteristic bank to assess the students understanding of the concept.

Guided Practice: The students will use the paper to construct their own individual outlines. The students will supply answers and the teacher will write the answers on the board under the name of each layer.

Independent Practice: The students will work independently to complete their outline of the forest layers.

Check for Understanding/Closure: The teacher will randomly call on students to describe and share a particular layer and its characteristics with the class. The Notes Outline and forest layer outlines will be collected.

Forest Layers Characteristic Bank for Teacher Use

1. **Soil**
   Contains organisms that decompose biomass.
   Most biologically productive ecosystem.
   Contains millions of microbes.
   Can be called the hidden forest.
   Insects are common.
   Fungi are common.

2. **Forest Floor**
   Where most forest mammals live.
   A good place of biologist to set up cameras to watch animals.
   Fallen logs are common.
   Moss and ferns are common plants.

3. **Shrub Layer**
   Very thick layer.
   Right above the forest floor.
   Characterized by relatively short plants.
   "Springtime Specialists" that have growth spurts before deciduous trees leaf out

4. **Understory**
   Open space above shrubs.
   Enclosed at the top by the canopy.
   Birds use for rapid flight.

5. **Canopy**
   Highest layer.
   Many horizontal branches.
   Where trees get most sunlight for photosynthesis.
   Location of the most active growth of trees.
   High biodiversity.
   Relatively even layer when looking from above.

Notes Outline for Forest Secrets Video

Name_____

Period_____ Date_____

Directions: Fill in the blanks while watching the video.

Chapter One: Introduction

1. Trees are not supposed to stand in _____.
2. The nature of trees is to live in _____.
3. Trees are like highly social _____.
4. Trees live in _____.

Chapter Two: Types of Forests

5. Which type of forests stretch like a belt around the equator? _____
6. Huge volumes of water wash down from the sky in both _____and _____rainforests.
7. Temperatures change a lot in _____rainforest.
8. _____forests grow at high altitudes on mountain slopes.
9. In the tropics, when mountains rise sharply from the ocean it is a good place to find _____.

10. Why are plants continuously wet in a cloud forest?

    _____

11. Middle latitudes are good places for

    _____ forests.

12. Hardwood forests are mostly made up

    of_____.

13. Deciduous trees' leaves _____in the Fall.

14. The _____forest is in a belt around the earth beginning east of Scandinavia, across Siberia, and then across Canada as well.

15. The taiga forest is made up of cold-

    adapted_____.

16. The taiga is so expansive that it is considered the

    _____ on the planet.

17. Flooded woodlands flood _____ a year.

18. Another example of a flooded woodlands is the

    _____ in South America.

19. During the rainy season, water can rise to _____.

20. Some trees can be submerged for _____

    at a time.

21. There are as many _____as there are locations on the earth.

22. The soil type, climate, etc. result in a _____ ecosystem for each forest.
23. Every forest in North America is a _____.
24. Secondary forests are relatively _____ compared to primary forests.
25. Large trees that have never been cut art part of a _____ forest.
26. Primary forests are very much as they were before _____ came to North America.

Chapter Three: Enormous Time Scale

27. Cathedral grove is filled with _____ trees.
28. A tree that took root at the time of George Washington is relatively _____ in a forest of giants.
29. Aspen trees spread via _____ or lateral roots.
30. The aspen trees are more like _____ than individual trees.
31. These single collective organisms can live for _____ years.

Chapter Four: The Soil Layer

32. The forest consists of _____ layers.

33. The _____ layer contains organism that decompose biomass.
34. Soil is the most _____ ecosystem on the planet.
35. The majority of organisms in soil are _____ as many as _____cells per one gram of soil.
36. In a handful of dirt that are more microbes than _____.
37. The contents of the soil can also be called the _____.
38. A fallen tree gives us a good view of its _____.
39. _____ extend into the ground to give the tree nutrients in times of drought.
40. The majority of tree roots extend _____.
41. These wide/shallow give the tree its _____.
42. Above ground lateral process that stabilize the tree are called _____.
43. In the tropics, the large roots that stabilize tress from strong winds are called _____.
44. Each fallen log becomes a _____.
45. _____ and other organic molecules of the wood are digested.

46. Biologists refer to fallen logs that have trees growing out of them as _____.
47. Fallen logs can be called linear nurseries because _____.
48. A circular hole in the formation of tree roots indicates that a tree probably grew on a _____.

Chapter Five: The Forest Floor

49. Most large mammals live on the _____.
50. Biologists use _____ to get an objective distribution of animals in an area.

Chapter Six: The Shrub Layer

51. Relatively short plants make their living in the _____ layer.
52. _____ trees that lose their leaves afford the shrub layer a few months of direct sunlight.
53. In a _____ forest there is almost no shrub layer.
54. The light is low below the canopy because the trees have _____.

Chapter Seven: The Understory

55. The open space above between the canopy and the shrub layer is the _____.

56. Birds use this space for _____.

Chapter Eight: The Canopy

57. _____ make up highways in the canopy.
58. Trees take in sunlight for _____.
59. The _____ layer has high biodiversity, just like the _____ layer.
60. The canopy can look like an _____when the wind blows.

Chapter Nine: Beauty

61. Forests can be compared to an _____.

Chapter Ten: The Forest at Night

62. Half of a forest's life is spent in _____.
63. _____ light can be used to see at night.
64. Many nocturnal animals use their sense of _____ to move through the forest.
65. The _____of the forest at night and during day has subtle differences.
66. Flowers that bloom only at night are trying to attract _____.
67. Animals can use _____to communicate with each other via smells.

68. The sounds at night are _____than during the day.
69. Animals rely largely on _____ for signaling at night.

Chapter Eleven: Stand and Fight Lifestyle

70. Plants have a _____ lifestyle.
71. Each seedling has to _____ with the other plants around it.
72. Fungi and animals are examples of biological _____ on plants.
73. _____ are used to deter plant predators.
74. One of the most distasteful trees are the _____ trees.
75. The _____ within the trees contains chemicals that make the tress inedible.
76. The two sides, _____ and _____ are usually in balance.

Chapter Twelve: Pine Bark Beetles

77. Insect _____ can make them more tolerant to the tree's defenses.
78. _____beetles are killing many communities of lodgepole pines.

79. In an area of Colorado _____ out of _____trees are infected by these beetles.
80. In other places, however, the scale of infected trees is _____out of _____.
81. The insects have a beneficial _____ that allows them to exploit these trees.
82. The few surviving trees have a _____ to the beetles.

Chapter Thirteen: Wind

83. Another treat to trees is _____.
84. It is important that tree branches _____ more than they break.
85. Each leaf can act like a miniature _____
86. The _____ the tree, the greater the amplification of forces.
87. About once a week a _____ brings gusty winds.
88. *Strong winds cause the trees' canopies to grow relatively _____ in height.
89. Trees at the same height provide a partial _____ for each other.

Chapter Fourteen: Fire

90. The greatest threat to stand and fight plants is _____.
91. In many cases, during a lesser fire, many _____ survive.
92. Trees can be _____ to fire.
93. _____ and _____bark helps prevent the trees from being killed in a fire.
94. Branch _____or _____can also protect the tree from being consumed.
95. Fires are _____ or sometimes _____ occurrences in a tree's life.

Chapter Fifteen: Climate Moderation

96. Forests _____our weather patterns.
97. *Ecologists can refer to earth as a _____ planet.
98. Through _____ forests take moisture out of the atmosphere when it is too wet.
99. When it is too dry, they put moisture back into the atmosphere through_____.

Chapter Sixteen: Carbon Sequestration

100. On a longer time scale, forests also moderate the amount of _____ in our atmosphere.
101. The more CO_2 in the air the _____ our planet will get.
102. Where there is life there is _____.
103. _____ refers to the total weight of living things in any given area.
104. *Nothing has more biomass than _____.
105. When a tree is burned or decays the carbon is _____as _____.
106. When a tree is allowed to grow, it takes _____ (substance) _____ (direction) of the atmosphere.
107. When carbon is taken out of the air, climatologists say the carbon has been _____.
108. Instead of Carbon being a greenhouse gas in the atmosphere, it is stored in the _____of the trees.

Chapter Seventeen: Oxygen Production

109. Direct sunlight has the greatest impact on our biosphere in the _____.

110. _____ in tree leaves convert sunlight into sugars.

111. The rate of O_2 production from one leaf is like a _____.

112. *Forests impact the whole earth by _____, _____, and _____.

Chapter Eighteen: Closing

113. Some biologists say it would take a _____ to understand just one patch of the forest.

114. *Going to a forest can be compared to going _____.

Notes Outline for Forest Secrets Video

Completed Form for Teacher Use

Chapter One: Introduction

1. Trees are not supposed to stand in ISOLATION.
2. The nature of trees is to live in CROWDED COMMUNITIES.
3. Trees are like highly social HERD animals.
4. Trees live in FORESTS.

Chapter Two: Types of Forests

5. Which type of forests stretch like a belt around the equator? TROPICAL RAINFORESTS
6. Huge volumes of water wash down from the sky in both TEMPERATE and TROPICAL rainforests.
7. *Temperatures change a lot in TEMPERATE rainforest.
8. MONTANE FORESTS grow at high altitudes on mountain slopes.
9. In the tropics, when mountains rise sharply from the ocean it is a good place to find CLOUD FORESTS.
10. *Why are plants continuously wet in a cloud forest? CLOUDS ROLLING UP FROM THE SEA
11. Middle latitudes are good places for HARDWOOD FORESTS.
12. Hardwood forests are mostly made up of DECIDUOUS TREES.
13. Deciduous trees' leaves CHANGE COLOR/ FALL in the Fall.
14. The TIAGA FOREST is in a belt around the earth beginning east of Scandinavia, across Siberia, and then across Canada as well.
15. The taiga forest is made up of cold-adapted CONIFEROUS TREES.
16. The taiga is so expansive that it is considered the MOST SUCCESSFUL ECOSYSTEM on the planet.
17. Flooded woodlands flood ONCE a year.

18. Another example of a flooded woodland is the AMAZON RAINFOREST in South America.
19. During the rainy season, water can rise to 50 FT.
20. Some trees can be submerged for MONTHS at a time.
21. There are as many TYPES OF FORESTS as locations on the earth.
22. The soil type, climate, etc. result in a UNIQUE ecosystem for each forest.
23. Every forest in North America is a SECONDARY FOREST.
24. Secondary forests are relatively YOUNG compared to other forests.
25. Large trees that have never been cut art part of the PRIMARY FOREST.
26. Primary forests are very much as they were before COLUMBUS or the other Europeans came to North America.

Chapter Three: Enormous Time Scale

27. Cathedral grove is filled with DOUGLAS FIRS. They are COUSINS to the redwood and the sequoias of North America.
28. A tree that took root at the time of George Washington is relatively YOUNG in a forest of giants.
29. Aspen trees spread via RISOMOES or lateral roots.
30. The aspen trees are more like EXTENSIONS OF THE SAME ORGANISM than individual trees.
31. These single collective organisms can live for MILLENNIA.

Chapter Four: The Soil Layer

32. The forest consists of 5 layers.
33. The SOIL LAYER contains organism that decompose biomass.
34. Soil is the most BIOLOGICALLY PRODUCTIVE ecosystem on the planet.

35. The majority of organisms in soil are MICROBES as many as ONE MILION cells per one gram of soil.
36. In a handful of dirt that are more microbes than HUMANS ON THE EARTH.
37. *The contents of the soil can also be called the HIDDEN FOREST.
38. A fallen tree gives us a good view of its ROOTS.
39. TAP ROOTS extend into the ground to give the tree nutrients in times of drought.
40. The majority of tree roots extend LATTERALLY.
41. These one or two foot deep roots give the tree its LATERAL STABILITY.
42. Lateral process that stabilize the tree are called PROP ROOTS.
43. In the tropics, the roots to stabilize tress from strong winds are called BUTTRESSES.
44. Each fallen log becomes a MICROHABITAT.
45. CELLULOSE and other organic molecules of the wood are digested.
46. Biologists refer to fallen logs that have trees growing out of them as NURSE LOGS.
47. Fall logs can be called linear nurseries because SAPLINGS (BABY TREES) GROW OUT OF THEM.
48. *A circular hole in the formation of tree roots indicated that the tree grew from a NURSE LOG.

Chapter Five: The Forest Floor

49. Most of the mammals live on the FOREST FLOOR.
50. Biologists use CAMERAS to get the most objective distribution of animals in an area.

Chapter Six: The Shrub Layer

51. Relatively short plants make their living in the SHRUB LAYER.

52. DECIDUOUS trees that lose their leaves afford the shrub layer a few months of direct sunlight.
53. In a SPRUCE / CONIFEROUS forest there is almost no shrub layer.
54. The light is low below the canopy because the trees have A VERY THICK NEEDLE LAYER / DO NOT LOSE THEIR NEEDLES.

Chapter Seven: The Understory

55. The open space above between the canopy and the shrub layer is the UNDERSTORY.
56. Birds use this space for RAPID FLIGHTS.

Chapter Eight: The Canopy

57. HORIZONTAL BRANCHES make up highways in the canopy.
58. Trees take in sunlight for PHOTOSYNTHESIS.
59. The ACTIVE growth of the trees has similar to biodiversity of the SOIL layer.
60. *The canopy can look like an OCEAN when the wind blows.

Chapter Nine: Beauty

61. *Forests can be compared to an ART GALLERY / MUSIC.

Chapter Ten: The Forest at Night

62. Half of a forest's life is spent in DARKNESS.
63. *INFARRED light can be used at night to see.
64. Many nocturnal animals use their sense of TOUCH to move through the forest.
65. The SMELL of the forest at night and during day has subtle differences.
66. Flowers that bloom only at might are trying to attract NOCTURNAL POLLENATORS.

67. Animals can use PHEREMONES to communicate with each other via smells.
68. The sounds at night are LOUDER than during the day.
69. Animals rely largely on SOUNDS for signaling at night.

Chapter Eleven: Stand and Fight Lifestyle

70. Plants have a STAND AND FIGHT lifestyle.
71. Each seedling has to COMPETE with the other plants around it.
72. Fungi and animals are examples of biological ATTACKS on plants.
73. TOXINS are used to deter plant predators.
74. One of the most distasteful trees are the CONIFEROUS trees.
75. The SAP within the trees contains chemicals that make the tress inedible.
76. The two sides, TREES and TREE-EATERS are usually in balance.

Chapter Twelve: Pine Bark Beetles

77. Insect ADAPTATIONAS can make them more tolerant to the tree's defenses.
78. PINE BARK beetles are killing many communities of lodgepole pines.
79. In an area of Colorado 1 out of 10 trees are infected by these beetles.
80. In other places, however, the scale of infected trees is 9 out of 10.
81. The insects have a beneficial MUTATION that allows them to exploit these trees.
82. The few surviving trees have a NATURAL RESISTANCE to the beetles.

Chapter Thirteen: Wind

83. Another treat to trees is WIND.

84. It is important that tree branches BEND more than they break.
85. Each leaf can act like a miniature SAIL.
86. The TALLER the tree, the greater the amplification of forces.
87. About once a week a WEATHER FRONT brings gusty winds.
88. *Strong winds cause the trees' canopies to grow relatively EVEN in height.
89. Trees at the same height provide a partial WIND BREAK for each other.

Chapter Fourteen: Fire

90. The greatest threat to stand and fight plants is FIRE.
91. In many cases, during a lesser fire, many TREES survive.
92. Trees can be ADAPTED to fire.
93. THICK and SPONGY bark helps prevent the trees from being killed in a fire.
94. Branch DISTRIBUTION or LOCATION can also protect the tree from being consumed.
95. Fires are PERIODICAL or sometimes REGULAR occurrences in a tree's life.

Chapter Fifteen: Climate Moderation

96. Forests MODERATE our weather patterns.
97. *Ecologists can refer to earth as a GOLDILOCKS planet.
98. Through RAIN forests take moisture out of the atmosphere when it is too wet.
99. When it is too dry, they put moisture back into the atmosphere through EVAPORATION.

Chapter Sixteen: Carbon Sequestration

100. On a longer time scale, forests also moderate the amount of CO_2 in our atmosphere.
101. The more CO_2 in the air the HOTTER our planet will get.

102. Where there is life there is CARBON.
103. BIOMASS refers to the total weight of living things in any given area.
104. *Nothing has more biomass than TREES.
105. When a tree is burned or decays the carbon is RELEASED as CARBON DIOXIDE (CO_2).
106. When a tree is allowed to grow, it takes CO_2 (substance) OUT (direction) of the atmosphere.
107. When carbon is taken out of the air, climatologists say the carbon has been SEQUESTERED.
108. Instead of Carbon being a greenhouse gas in the atmosphere, it is stored in the BIOMASS of the trees.

Chapter Seventeen: Oxygen Production

109. Direct sunlight has the greatest impact on our biosphere in the FORESTS.
110. CHOLORPLASTS / CHLOROPHIL in tree leaves convert sunlight into sugars.
111. The rate of O_2 production from one leave is like a SLOW TRICKLE.
112. *Forests impact the whole earth by MODERATING OUR CLIMATE, SEQUESTERING CARBON, and RECHARGING OUR ATMOSPHERE.

Chapter Eighteen: Closing

113. Some biologists say it would take a LIFETIME to understand just one patch of the forest.
114. *Going to a forest can be compared to going HOME.

Multiple Choice Test Question Bank for Forest Secrets Video

Name_____

Period_____ Date_____

Directions: After watching the video, circle which letter represents the best answer to the question.

1. Which type of forest stretches like a belt around the equator?
    A. Tropical rainforests
    B. Taiga
    C. Montane forests

2. The taiga is so expansive that it is considered the _____ on the planet.
    A. Most invasive ecosystem
    B. Most successful ecosystem
    C. Most biologically diverse

3. Primary forests are very much as they were before who came to North America?
    A. Christopher Columbus
    B. George Washington
    C. Dinosaurs

4. Soil is known for being the most _____ ecosystem on the planet.
    A. Useless
    B. Unhealthy
    C. Biologically productive

5. The majority of organisms in soil are _____.
    A. Insects
    B. Tree roots
    C. Microbes

6. What can the contents of the soil be called?
    A. The Hidden Forest
    B. The Fungi Forest
    C. The Insect's World

7. In which direction do the majority of tree roots extend?
    A. Downward
    B. Laterally
    C. Diagonally

8. Each fallen log becomes a_____.
    A. Nothing
    B. Piece of garbage
    C. Microhabitat

9. What kind of organic molecules of the wood are digested?
    A. Cellulose
    B. Dirt
    C. Oxygen

10. When the wind blows, how can the forest canopy look?
    A. Like an ocean
    B. Like a solid block
    C. Like unrelated movements

11. Forests can be compared to _____.
    A. An art gallery
    B. Music
    C. Both A and B

12. What kind of light was used by Elizabeth to see at night?
    A. Flood lights
    B. Infrared lights
    C. Blue lights

13. Insect _____can make them more tolerant to trees' defenses.
    A. Adaptations
    B. Body Size
    C. Coloration

14. The few surviving lodgepole trees have a _____ the pine bark beetles.
    A. Stronger defense against
    B. Natural resistance to
    C. Better relationship with

15. Each leaf can act like a miniature_____ when it comes to catching wind.
    A. wall
    B. blade
    C. Sail

16. As a result of strong winds, how do trees' canopies usually grow?
    A. Relatively even in height
    B. At random heights
    C. Close to the ground

17. Ecologists can refer to earth as a _____ planet.
    A. Clean
    B. Goldilocks
    C. Unpredictable

18. What organisms have the most biomass?
    A. Elephants
    B. Humans
    C. Trees

19. What organelle in a plant cell converts sunlight into sugars?
    A. The nucleus
    B. The mitochondrion
    C. The chloroplasts

20. Forests impact the whole earth by _____.
    A. Moderating our climate
    B. Sequestering carbon
    C. Recharging our atmosphere
    D. All of the above

21. Some biologists say it would take a _____ to understand just one patch of the forest.
    A. Few years
    B. Lifetime
    C. Couple of weeks

22. The narrator of the Forest Secrets film said that going to a forest can be compared to going where?
    A. Home
    B. On vacation
    C. To a distant planet

23. What do Deciduous trees' leaves do in the Fall?
    A. Drop to the ground
    B. Change color
    C. Both A and B

24. Why are plants continuously wet in a cloud forest?
    A. Clouds rolling up from the sea
    B. The plants sweat
    C. It rains all the time

25. How many times do flooded woodlands flood per year?
    A. Five times
    B. Twice
    C. Once

26. The light in coniferous forests is low below the canopy because the trees _____.
    A. Have a very thick needle layer
    B. Do not drop their needles
    C. Both A and B

27. What kind of lifestyle do plans have?
    A. Keep Calm
    B. Stand and Fight
    C. Go with the flow

28. More CO_2 in our air will do what to the planet?
    A Make it hotter
    B. Cause no change
    C. Make it colder

Multiple Choice Test Question Bank for Forest Secrets Video
Answer Key for Teacher Use

1. Which type of forest stretches like a belt around the equator?
   - **A. Tropical rainforests**
   - B. Taiga
   - C. Montane forests

2. The taiga is so expansive that it is considered the _____ on the planet.
   - A. Most invasive ecosystem
   - **B. Most successful ecosystem**
   - C. Most biologically diverse

3. Primary forests are very much as they were before who came to North America?
   - **A. Christopher Columbus**
   - B. George Washington
   - C. Dinosaurs

4. Soil is known for being the most _____ ecosystem on the planet.
   - A. Useless
   - B. Unhealthy
   - **C. Biologically productive**

5. The majority of organisms in soil are _____.
   - A. Insects
   - B. Tree roots
   - **C. Microbes**

6. What can the contents of the soil be called?
    - **A. The Hidden Forest**
    - B. The Fungi Forest
    - C. The Insect's World

7. In which direction do the majority of tree roots extend?
    - A. Downward
    - **B. Laterally**
    - C. Diagonally

8. Each fallen log becomes a_____.
    - A. Nothing
    - B. Piece of garbage
    - **C. Microhabitat**

9. What kind of organic molecules of the wood are digested?
    - **A. Cellulose**
    - B. Dirt
    - C. Oxygen

10. When the wind blows, how can the forest canopy look?
    - **A. Like an ocean**
    - B. Like a solid block
    - C. Like unrelated movements

11. Forests can be compared to _____.
    - A. An art gallery
    - B. Music
    - **C. Both A and B**

12. What kind of light was used by Elizabeth to see at night?
    A. Flood lights
    B. Infrared lights
    C. Blue lights

13. Insect _____can make them more tolerant to trees' defenses.
    A. Adaptations
    B. Body Size
    C. Coloration

14. The few surviving lodgepole trees have a _____ the pine bark beetles.
    A. Stronger defense against
    B. Natural resistance to
    C. Better relationship with

15. Each leaf can act like a miniature_____ when it comes to catching wind.
    A. Wall
    B. Blade
    C. Sail

16. As a result of strong winds, how do trees' canopies usually grow?
    A. Relatively even in height
    B. At random heights
    C. Close to the ground

17. Ecologists can refer to earth as a _____ planet.
    A. Clean
    B. Goldilocks
    C. Unpredictable

18. What organisms have the most biomass?
    A. Elephants
    B. Humans
    C. Trees

19. What organelle in a plant cell converts sunlight into sugars?
    A. The nucleus
    B. The mitochondrion
    C. The chloroplasts

20. Forests impact the whole earth by _____.
    A. Moderating our climate
    B. Sequestering carbon
    C. Recharging our atmosphere
    D. All of the above

21. Some biologists say it would take a _____ to understand just one patch of the forest.
    A. Few years
    B. Lifetime
    C. Couple of weeks

22. The narrator of the Forest Secrets film said that going to a forest can be compared to going where?
    A. Home
    B. On vacation
    C. To a distant planet

23. What do Deciduous trees' leaves do in the Fall?
    A. Drop to the ground
    B. Change color
    C. Both A and B

24. Why are plants continuously wet in a cloud forest?
    A. Clouds rolling up from the sea
    B. The plants sweat
    C. It rains all the time

25. How many times do flooded woodlands flood per year?
    A. Five times
    B. Twice
    C. Once

26. The light in coniferous forests is low below the canopy because the trees _____.
    A. Have a very thick needle layer
    B. Do not drop their needles
    C. Both A and B

27. What kind of lifestyle do plans have?
    A. Keep Calm
    B. Stand and Fight
    C. Go with the flow

28. More CO_2 in our air will do what to the planet?
    A Make it hotter
    B. Cause no change
    C. Make it colder

Fill-in-the-Blank Test Question Bank

Name_____

Period_____ Date_____

Directions: After watching the video, answer the questions below by filling in the blanks.

1. Trees live in communities called what?

   _____

2. The taiga forest is mostly made up of this cold-adapted species of trees. _____

3. Hardwood forests are mostly made up of what kind of trees? _____

4. Large trees that have never been cut art part of what kind of forest? _____

5. Every forest in North America has been cut down at some point so the forests we see are

   _____.

6. How many layers are in a forest?

   _____

7. Most of the mammals live on what layer of the forest?

_____

8. What is the open space above between the canopy and the shrub layer? _____

9. The sounds of a forest at night are _____than during the day.

10. The _____within coniferous trees contains chemicals that make the tress inedible

11. _____beetles are killing many communities of lodgepole pines.

12. When it is too dry, forests put moisture back into the atmosphere through what process? _____

13. It is important that tree branches _____ more than they break.

14. On a longer time scale, forests also moderate the amount of what gas in our atmosphere?

_____

Answer Key to Fill-in-the-Blank Test Questions for Teacher Use

1. Trees live in communities called what? **FORESTS**
2. The taiga forest is mostly made up of this cold-adapted species of trees. **CONIFEROUS**
3. Hardwood forests are mostly made up of what kind of trees? **DECIDUOUS TREES**
4. Large trees that have never been cut art part of what kind of forest? **PRIMARY**
5. Every forest in North America has been cut down at some point so the forests we see are **SECONDARY FORESTS.**
6. How many layers are in a forest? **5**
7. Most of the mammals live on what layer of the forest? **THE FOREST FLOOR**
8. What is the open space above between the canopy and the shrub layer? **THE UNDERSTORY**
9. The sounds of a forest at night are _____than during the day. **LOUDER**
10. The _____within coniferous trees contains chemicals that make the tress inedible. **SAP**
11. _____beetles are killing many communities of lodgepole pines. **PINE BARK**
12. When it is too dry, forests put moisture back into the atmosphere through what process? **EVAPORATION**
13. 8It is important that tree branches _____ more than they break. **BEND**
14. On a longer time scale, forests also moderate the amount of what gas in our atmosphere. **CO_2**

Essay Question Bank for Forest Secrets Video

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

1. This film shows the beauty and benefits provided by forests. Write an essay recapping these points and emphasizing the most important in your opinion.

2. One major theme of this film is the importance of experiencing the forest in ways that are not characteristic of most humans. What special experiences would you get if you followed the film's advice? Which would you consider the most important?

3. List the difference between broadleaf deciduous trees and coniferous trees.

4. Draw your favorite type of forest and explain, in complete sentences, the characteristics of that type of forest and why it is your favorite.

5. Explain why plants have a "stand and fight" lifestyle.

6. Explain the structure of the forest.

7. Is a tree standing along alone the way trees naturally grow? Why or why not?
8. Which layer(s) of the forest has/have the highest biodiversity? Why?

9. Why is it important for plants and plant-eaters to be in balance?

10. How can flooded forests survive?

11. How are aspen trees connected to each other?

12. How are trees able to stand even when winds blow very hard?

13. How do animals in the forest communicate at night?

14. Describe what you think is the greatest threat to forests. Why?

15. What is carbon sequestration and how is that important for us?

16. Name and explain the ways in which humans affect forests?

17. Why should forests be protected?

18. The lives of trees span great lengths of time, up to 800 years! Since they are so ancient, imagine what they might have experienced watching human history unfold.

19. Now that we have a better appreciation for the earth's forests, what can we do to be responsible consumers when it comes to paper and wood products? (Being a proper consumer)

Essay Question Bank for Forest Secrets Video with Topic Points for Teacher Use

Teachers: Each student essay should include the points below that follow each prompt.

1. This film shows the beauty and benefits provided by forests. Write an essay recapping these points and emphasizing the most important in your opinion.
   - Forests sequester carbon: the process of removing excess carbon from our atmosphere.
   - Forests moderate our climate.
   - Forests recharge our atmosphere by producing oxygen.

2. One major theme of this film is the importance of experiencing the forest in ways that are not characteristic of most humans. What special experiences would you get if you followed the film's advice? Which would you consider the most important?
   - We should experience the forest in three dimensions.
   - We should experience it in different weather conditions.
   - We should experience it at different times of the day.

3. List the difference between broadleaf deciduous trees and coniferous trees.
   - Deciduous leaves lose their leaves in the Fall and do not grow them back until late Spring.
   - They also have a patchy canopy.
   - Deciduous trees are mainly found in hardwood forests.
   - Coniferous trees, or evergreen trees, do not drop their needles throughout the year and have a very thick canopy.
   - Coniferous trees are mainly found in the taiga.

4. Draw your favorite type of forest and explain, in complete sentences, the characteristics of that type of forest and why it is your favorite.
    - Taiga: Cold, north, coniferous trees.
    - Rainforest: Wet, equator "belt," high biodiversity.
    - Montane: High elevations, along mountains.
    - Cloud Forest: Clouds roll up from the sea, plants are always wet.

5. Explain why plants have a "stand and fight" lifestyle.
    - Plant cannot move around to gather the nutrients they need.
    - They have to compete with other trees and defend against predators (herbivores) in whatever environment their seed originally fell.

6. Explain the structure of the forest.
    - The forest has five layers: the soil, the forest floor, the shrub layer, the understory and the canopy.
    - There are the most species in the soil and in the canopy.

7. Is a tree standing along alone the way trees naturally grow? Why or why not?
    - Trees are not supposed to grow alone but in crowed communities we call forests.

8. Which layer(s) of the forest has/have the highest biodiversity? Why?
    - The soil and the canopy have the most biodiversity. The soil contains all of the microbes and other organisms that work to break down materials. The canopy is home to a large number of birds, both permanent residents and migratory birds.

9. Why is it important for plants and plant-eaters to be in balance?
    - Without a proper balance between the plant and the plant-eaters one will die off while the other will become too populous and start to take over.
    - In the film, the pine bark beetle was eating and killing many lodgepole trees in Colorado.

10. How can flooded forests survive?
    - They have seasonal periods of dry which allow the large trees to grow.
    - The dry seasons allow these trees to get oxygen to their root systems.
    - The flooding can last for months.
    - In the film, the Amazon rainforests were an example of a flooded forest.

11. How are aspen trees connected to each other?
    - Aspens can spread via rhizomes (lateral root that extend sideways from their origin).
    - In the film, the aspen grove trees were extensions of the same organism. They are all trees off of the same root system.

12. How are trees able to stand even when winds blow very hard?

    - Tree branches bend more than they break so the trees are able to sustain strong winds.
    - The tree's lateral roots and prop root at the base of the tree provide lateral stability when the wind blows.

13. How do animals in the forest communicate at night?
    - Animals communicate through their sense of hearing by signaling to each other.
    - They can also use pheromones to communicate with each other via their sense of smell.

14. Describe what you think is the greatest threat to forests. Why?
    - Humans: Logging
    - Insects: Pine Bark Beetles
    - Fire
    - Wind

15. What is carbon sequestration and how is that important for us?
    - Carbon sequestration is the process of taking carbon out of the air.
    - This happens when trees are allowed to grow.
    - If there is too much carbon in our atmosphere the temperature of the earth will become hotter.

16. Name and explain the ways in which humans affect forests?
    - Humans have cleared away forests for logging purposes as well as to make room for our cities and our farms.
    - On the other hand, humans can also preserve forests.

17. Why should forests be protected?
    - Forests sequester carbon (the process of removing excess carbon from our atmosphere).
    - Forests moderate our climate.
    - Forests recharge our atmosphere by producing oxygen.
    - Forests are beautiful parts of our ecosystems.
    - Forests are homes to many species.

- They are a critical part of our planet and deserve to be protected.

18. The lives of trees span great lengths of time, up to 800 years! Since they are so ancient, imagine what they might have experienced watching human history unfold.
    - Creative writing assignment.

19. Now that we have a better appreciation for the earth's forests, what can we do to be responsible consumers when it comes to paper and wood products?
    - Recycle paper and cardboard.
    - Buy recycled paper.
    - Use reclaimed wood.