

# Lesson 5

## Forest Health

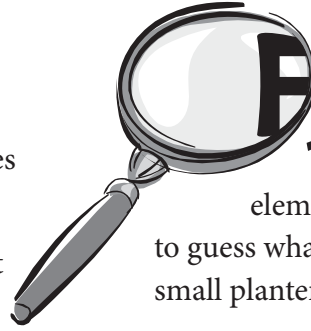


## Objectives:

1. To understand how overcrowding makes trees vulnerable to insects, disease, and wildfires.
2. To understand that enlightened management using sustained forestry, prescribed burns, and thinning provides forest health and ensures that California will never run out of trees.
3. To understand the relationship between the function and parts of a tree and those of humans.

## Subjects:

1. Critical Reasoning
2. Forestry
3. Ecology



## Focus:

1. Establish the concept of competition as an element of all forms of life by asking the students to guess what happens if you plant 1000 carrot seeds in a small planter.

- *Many of them will be weak and small.*
- *They will be overcrowded*
- *Many will die because there isn't enough space, nutrients and water for all 1000 carrots.*

2. Establish the concept of the forest as a large garden. Gardens that are healthy, beautiful, and productive need to have plenty of water, fertile soil, protection against insects and diseases, and thinning of overcrowded plants. If they remain overcrowded, there is too much competition for nutrients, water, and sunlight. They soon become stressed and vulnerable. Thinnings in the garden can be used as food or as fertilizer in a compost pile. Thinnings in the forest are harvested trees used for forest products or to produce energy in cogeneration plants.

3. Establish the concept of sustainable forestry by asking the students to figure out a plan by which they can keep picking flowers from their garden all year.

**They can replant new flowers as others are being harvested.**

4. Establish the concept of checks and balances in nature by asking the students to come up with ways in which the forest is kept from being overcrowded and becoming weak and unhealthy.

**Insects, diseases, natural and controlled fires, and thinning help keep a natural balance in the forest.**

5. Use the **Forest Facts** discussion themes to reinforce key forestry concepts before students initiate the other activity sheets.

## VOCABULARY

1. **Wildfire:** a fire that is burning out of control and unpredictably.
2. **Prescribed Burn:** to deliberately burn forest fuels under specific environmental conditions that allow the intensity and rate of fire spread to be controlled to achieve specific management objectives.
3. **Habitat:** the place that is home to a plant or animal.
4. **Conifer:** a cone-bearing evergreen tree.
5. **By-Product:** something that is made in the process of making something else.
6. **Cambium:** clusters of tree cells that produce new layers of bark and wood each year forming the tree rings that we can count to tell the age of a tree.
7. **Natural Regeneration:** the process by which seeds sprout to produce seedlings in the wild, without the use of a nursery to cultivate them.

# Enrichment Activity:

1. Have the students decode the message on page 30 to discover the basic **Natural Disasters of the Forest**.
2. Have students work **The Puzzle Box** on page 33 to find out why California will never run out of trees.
3. Have the students decypher **A Forest Puzzle** on page 32 to find out what two procedures can help maintain forest health.



## ANSWER KEY

### FOREST FACTS

1. One hundred and fifty years ago, California forests were more “open” than they are today. What does that mean?
2. In some places, where there used to be 80 trees per acre of land, now there are more than three hundred trees. How healthy do you think those three hundred trees are? What could you do to make them healthier?

#### Answer:

The forest was not as dense.

Overcrowded trees are stressed from too much competition. To make them healthier, they should be thinned by careful harvesting and prescribed burns to remove brush.

3. Overcrowding in the forest makes trees unhealthy. They have to compete too heavily for sun, food, and water. This competition weakens them. They cannot resist wildfires, insects, and disease. What does competition mean? Can you think of other examples where too much competition is unhealthy?

#### Answer:

- Competition is when two or more persons or things try to get the same object.
  - Too much competition between friends or family members can cause hard feelings.
  - Too much competition in the classroom for grades makes a student lose sight of what is truly important—the learning going on.
4. Dead and dying trees produce great amounts of fuel which feed wildfires. These fires rage out of control and are hard to stop. Describe what happens in a wildfire to all the elements of this ecological community.

#### Answer:

- Animals and people are forced to leave the area or are injured.
  - Many plants and trees are destroyed.
  - Tons of greenhouse gases and other pollutants are emitted.
  - Millions of dollars are lost in fighting wildfires.
  - Water quality is degraded.
5. Raging wildfires get so hot that they bake the “biota” out of the soil. If “bio” means life, what do you guess “biota” means? What other “bio” words can you think of?

#### Answer:

- Biota: *living things*
- Biology: *the study of living things*
- Bionic: *life-like*
- Biography: *the writing about someone’s life*

6. Prescribed burns are a management tool that can be used under specific conditions to meet different management goals, such as preventing the buildup of excess fuels, which reduces the likelihood of an intense, uncontrollable wildfire. Prescribed burning may also be used to control populations of invasive weeds or prepare an area for replanting trees. Wildlife habitat is also improved after a low intensity burn due to the new forage that becomes available when new shrubs and grasses sprout up. Prescribed burns are used in areas where the forest has been managed and excess fuels have not built up. They are typically used during the wet season and are monitored by forestry professionals who make sure the fire stays under control.

# Forest Facts



Name \_\_\_\_\_

Read the information and questions below then write your answers on the back of this sheet.

- 1.** One hundred and fifty years ago, California forests were more “open” than they are today. What does that mean?
- 2.** In some places, where there used to be twenty trees per acre of land, now there are more than three hundred trees. How healthy do you think those three hundred trees are? What could you do to make them healthier?
- 3.** Overcrowding in the forest makes trees unhealthy. They have to compete too heavily for sun, food, and water. This competition weakens them. They cannot resist wildfires, insects, and disease. What does competition mean? Can you think of other examples where too much competition is unhealthy?
- 4.** Dead and dying trees produce great amounts of fuel which feeds wildfires. These fires rage out of control and are hard to stop. Describe what happens in a wildfire to all the elements of this ecological community.
- 5.** Raging wildfires get so hot that they bake the “biota” out of the soil. If “bio” means life, what do you think “biota” means? What other “bio” words can you think of?
- 6.** How are prescribed burns and wildfires different? How can prescribed burns be beneficial?





























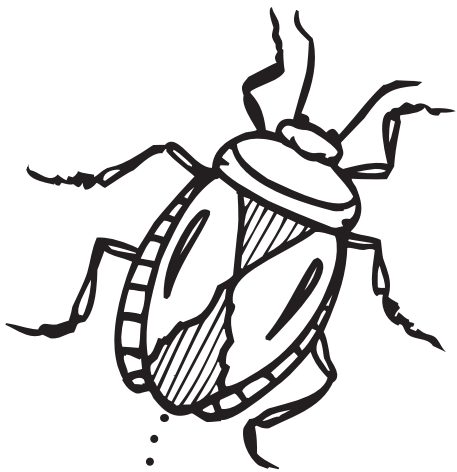
# Natural Disasters of the Forest

 Name \_\_\_\_\_

Use the key to unlock the message. The answer is hidden somewhere on the page.

## LETTER KEY

						
A	B	C	D	E	F	
						
G	H	I	J	K	L	M
						
N	O	P	Q	R	S	
						
T	U	V	W	X	Y	Z



# A Forest Puzzle



Name \_\_\_\_\_

What two forest management methods help keep California's forests healthy? To find out, follow the directions and work the puzzle below.

**DIRECTIONS:**

1<sup>st</sup> Write the words that fit the definitions in Section A.

2<sup>nd</sup> Match the letters and numbers from Section A with the letters and numbers of Section B.

3<sup>rd</sup> To help you get started, we've filled in one letter in each word of Section A and B.

## Section A

1. The place that is home to a plant or an animal is called:

                                                  
I  
                                                  
 13 14 10 4 11 14 11

2. Because they make cones, we call evergreen trees:

                                                         
C  
                                                         
 1 2 3 4 5 6 7 8

3. Cones make these from which new trees will sprout:

                                    
D  
                                    
 8 6 6 9 8

4. These insects eat a circle around a tree which prevents food and water from reaching all parts of the tree:

                                                         
T  
                                                         
 10 6 6 11 12 6 8

5. A wood by-product that is a sticky substance from which many forest products are made is called:

                                           
G  
                                           
 12 4 17 3 4 3

6. Thanks to this part of a tree, we can count the rings to tell the age of the tree:

                                                         
M  
                                                         
 1 14 15 10 4 16 15

## Section B

1. These can help keep the forest healthy:

                                                         
H  
                                                         
 11 13 4 3 3 4 3 17

                      
N  
                      
 14 3 9

                                                                       
E  
                                                                       
 1 2 3 11 7 2 12 12 6 9

                                    
B  
                                    
 10 16 7 3 8



# A Forest Puzzle

## ANSWER KEY

### Section A

1. The place that is home to a plant or an animal is called:

H A B I T A T  
13 14 10 4 11 14 11

2. Because they make cones, we call evergreen trees:

C O N I F E R S  
1 2 3 4 5 6 7 8

3. Cones make these from which new trees will sprout:

S E E D S  
8 6 6 9 8

4. These insects eat a circle around a tree which prevents food and water from reaching all parts of the tree:

B E E T L E S  
10 6 6 11 12 6 8

5. A wood by-product that is a sticky substance from which many forest products are made is called:

L I G N I N  
12 4 17 3 4 3

6. Thanks to this part of a tree, we can count the rings to tell the age of the tree:

C A M B I U M  
1 14 15 10 4 16 15

### Section B

1. These can help keep the forest healthy:

T H I N N I N G  
11 13 4 3 3 4 3 17

A N D  
14 3 9

C O N T R O L L E D  
1 2 3 11 7 2 12 12 6 9

B U R N S  
10 16 7 3 8





Name \_\_\_\_\_

# Puzzle Box

To uncover the secret ending to the message below, you will need to work with both the message box and the puzzle box.

Below each letter in the message box you will find two numbers. Find the first number of each set along the left side of the puzzle box. Find the second number along the bottom of the puzzle box.

If you move your left finger from the first number toward the right along its grid line, and you move your right finger toward the top along its grid line, you will end up with both fingers in the same square. The letter you find in that square can now be put in the message box.

Two letters have already been filled in for you to help you get started. Can you retrace how we found them?

## MESSAGE:

*California will never  
grow out  
of trees  
because  
foresters  
practice...*



## Puzzle Box

1	E	G	L	W	J
2	P	A	R	D	T
3	B	M	O	X	F
4	H	C	Q	U	N
5	V	S	K	Y	I
	6	7	8	9	10



## Message Box

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="T"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
5/7	4/9	5/7	2/10	2/7	5/10	4/10	2/7	3/6	1/8	1/6
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="Y"/>	<input type="text"/>	<input type="text"/>
3/10	3/8	2/8	1/6	5/7	2/10	2/8	5/9			



# Puzzle Box

## ANSWER KEY

### MESSAGE:

*California will never  
run out  
of trees  
because  
foresters  
practice...*



## Puzzle Box

1	E	G	L	W	J
2	P	A	R	D	T
3	B	M	O	X	F
4	H	C	Q	U	N
5	V	S	K	Y	I
	6	7	8	9	10

## Message Box

S	U	S	T	A	I	N	A	B	L	E
5/7	4/9	5/7	2/10	2/7	5/10	4/10	2/7	3/6	1/8	1/6
F	O	R	E	S	T	R	Y			
3/10	3/8	2/8	1/6	5/7	2/10	2/8	5/9			