



# 2009 Wisconsin Envirothon **KEY**

## Forestry Exam

Answers that are correct but differ strongly from answer key must be initialized by Station Captain as an approved answer prior to delivery to score stewards.

Provide the common name and Latin name of each tree using the picture of leaf, twig, and fruit and the leaf description. (14 pts, 1 pt for common names, 1 pt for Latin names)

1. Common Name: Paper Birch  
Latin Name: Betula papyrifera
2. Common Name: Balsam Fir  
Latin Name: Abies balsamea
3. Common Name: Shagbark Hickory  
Latin Name: Carya ovata
4. Common Name: Eastern White Pine  
Latin Name: Pinus strobus
5. Common Name: Red Maple  
Latin Name: Acer Rubrum
6. Common Name: White Spruce  
Latin Name: Picea glauca
7. Common Name: White Ash  
Latin Name: Fraxinus Americana

**Matching Questions**

**Match the term on the left with the correct definition on the right. (9 pts, 1 pt each)**

- |                          |   |   |
|--------------------------|---|---|
| 8. Ecosystem             | A | a. An interacting system of living and non-living components of the environment.  |
| 9. Ecotone               | B | b. Areas where two plant communities meet and overlap.  |
| 10. Forest Succession    | H | c. Changes that occur in areas devoid of existing plant communities.  |
| 11. Habitat              | I | d. Distinct plant communities or stages within a successional pathway.  |
| 12. Niche                | F | e. Proceeds from a state where organisms are present but from which a community was removed.                                  |
| 13. Primary Succession   | C | f. Role that an organism plays in a natural system.   |
| 14. Secondary Succession | E | g. The ability to withstand stress.   |
| 15. Seral Stage          | D | h. The orderly and progressive replacement of one community by another until a relatively stable community occupies the area. |
| 16. Tolerance            | G | i. The place where an organism lives.   |

17. Aspen, white oak and sugar maple each represent a different seral stage. Please identify the correct seral stage where each of these trees would normally be found. (3 pts, 1 pt each)

- a. Pioneer stage: Aspen
- b. Intermediate stage: White Oak
- c. Climax stage: Sugar Maple

18. What are the two major disturbances that typically reverse or setback the normal process of succession in the Lake States region? (4 pts, 2pts each)

- a. Fire
- b. Wind

19. Jack pine is an intolerant species. Why is it considered intolerant? (4 pts, 2pts each)

- a. Requires a disturbance to regenerate
- b. Seedlings need full sunlight to reach the soil to germinate and grow

**The following series of questions ask you to identify specific characteristics about the northern hardwood stand and pine plantation.**

20. Identify which stand is made up of pioneer species and which is made up of late successional species. (6 pts, 2 pts each)

- a. Northern Hardwood Stand: Late Successional Species
- b. Pine Plantation: Pioneer Species
- c. How do you know that? The pine plantation is a monoculture that is being replaced by white pine which is a shade tolerant species

21. Identify which stand is even-aged and which is uneven-aged. (6 pts, 2 pts each)

- a. Northern Hardwood Stand: Uneven-aged
- b. Pine Plantation: Even-aged
- c. How do you know that? The pine plantation is made up of overstory trees that were planted at the same time. The northern hardwood stand is a mix of species of various sizes.

22. Which stand, the northern hardwood or the pine plantation, has higher biological diversity? (4pts, 2 pts each)

a. The northern hardwood stand

b. How do you know that? The northern hardwood stand is made up of a variety of different species with multiple canopy layers

23. Assume that global warming is a real and serious threat that will continue to cause increases in average global temperature... (4 pts, 2 pts each)

a. How will this affect trees species currently found in Wisconsin? \_\_\_\_\_

One point Some current species will be marginalized

One point replaced by trees better adapted to warmer climates

b. How will this affect annual growth? \_\_\_\_\_

One point Annual growth rates should increase

One point unless rainfall becomes a limiting factor

24. There are two common types of survey methods: Surveys using fixed radius plots and surveys using variable radius plots. What is the difference between the two survey methods? (4 pts, 2 pts each)

Fixed radius plots are established with a given size or "fixed area." Then, every tree within the boundaries of the plot is measured for the data specified by the sample. A variable radius plot: a sample "point" is located and a mathematical/statistical process is employed to select individual trees to be "sampled" from that point.

25. Please define the terms cull and snag. (4 pts, 2 pts each)

a. A snag tree is: A dead tree that is still standing.

b. A cull tree is: a living tree is of sufficient DBH to be classified as pulpwood or either category of sawtimber, but does not have any merchantable material

The following questions must be answered using the identified trees and available equipment. Everything that you need to answer these questions has been provided.

25. For each of the following trees (18 pts total, 6pts for each tree, 1 pt for each column)

- Identify the correct species
- Use the Biltmore stick to estimate the DBH (2" diameter class) of the designated trees.
- Use the Diameter tape to measure the DBH (1" diameter class) of the designated trees.
- Use the clinometer to measure the height of the designated trees.
- Use the Merritt Hypsometer and 100' tape to estimate the number of merchantable 16 foot logs (to the nearest ½ log) in each tree.
- Use the Biltmore stick to determine the volume of the designated tree.

Tree	Species	DBH Biltmore stick	DBH D-tape	Total Height	Merchantable logs (1/2 log)	Volume
1	Sugar Maple	12	11	70	1	47
2	Red Oak	18	18	74	1 ½	166
3	Red Pine	12	12	72	2 ½	85

26. Using the 10 Basal Area Factor prism, what is the Basal Area of the pine plantation? (Plot center is identified). (2 pts)

Basal area: 130 ft<sup>2</sup> of Basal Area / Acre

27. The average diameter for trees in this stand is 12 inches. Using the red pine stocking chart provided, is the pine plantation under-stocked, adequately stocked, or overstocked? (2 pts)

Adequately Stocked

28. Assume that these trees are growing at the rate of one inch in diameter every four years. Using the red pine stocking chart provided, when should the next harvest occur? (2 pts)

2021

29. Using the red pine stocking chart provided, how many trees per acre should be harvested? (2 pts)

70 trees per acre

30. You can determine the age of trees in the pine plantation using two different methods. What are they? (2 pts, 1 pt each)

- a. Counting the rings (core or cut stump)
- b. Counting the branch whorls

31. Using the provided site index chart, tree core, and the height measurement you took earlier, what is the site index of the pine plantation? (2 pts, ANSWER WILL BE DETERMINED AT SITE ON TEST DAY)

Site Index: \_\_\_\_\_

32. What are three conventional forest products that can be harvested from these stands?(6 pts, 2 pts each)

- a. Pulp or pulp wood
- b. Bolts or dimensional lumber
- c. Logs or veneer

33. What are two non-timber forest products that can be harvested from these stands?(2pts, 1 pt each)

- a. Maple Syrup
- b. Christmas Trees

**TIE BREAKER**

Define the Competitive Exclusion Principle and provide an example using the northern hardwood stand.

When two species compete for the same ecological niche, one species survives while the other expires, since complete competitors cannot coexist at the same place simultaneously. An example would be an invasive species outcompeting a native to takes its niche.

\_\_\_\_\_/12

Running Total: 100