



THAT'S MY TREE!

SUBJECTS: Science, Math, English/Language Arts, Health, Consumerism

GRADES: 6-8

DURATION: Two one-hour class periods

GROUP SIZE: One classroom of 20-25 students (or less)

SETTING: Outdoors and indoors

KEY VOCABULARY: Field guide, field notebook, scientific notebook, scientific research, observations, data, science conference

ANTICIPATORY SET: We have been studying various aspects of Mammoth Cave recently. Today, we are going to be scientists and make a field notebook.

OBJECTIVES: Students will be able to: 1) create a field notebook; 2) recognize and distinguish the various characteristics of trees within a study area.

MATERIALS: Each student should have a field notebook and a pen. Each group should have a tape measure, and a tree field guide such as *Kentucky Forest Trees: How to Know Them*, produced by University of Kentucky, College of Agriculture (FOR-1)



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BACKGROUND: A field notebook (also called a scientific notebook) is an essential component of every scientist's research life. Scientists use their notebooks every time they conduct research and each time they make observations in the laboratory or in the field.

Certain rules govern entries in a field notebook. A pen should always be used when writing in a field notebook, as pencil markings may become rubbed out or fade over time. Notes and observations are never erased or scratched out. If the written material is thought to be wrong, one line should be drawn through the word(s). (Ex: ~~Field Notebook~~). This allows the scientist to go back at a later date to take a second look at his or her thoughts and findings. What was thought to be wrong at one time – and therefore crossed out – may actually be correct. If only one line was drawn through the words it will still be legible for future references.

The students will use a field notebook to record information about trees. Oak and hickory trees primarily dominate the forests in and around Mammoth Cave National Park. Numerous other species can easily be found, including poplar, papaw, maple, sycamore, dogwood, and redbud trees. Variety is good in a forest. It helps to ensure that vegetation (and therefore habitat and food sources) will always be available. If only one species of tree is present, disease, blight, or fungus can wipe out acres of vegetation in a very short time. This could seriously affect a local ecosystem.

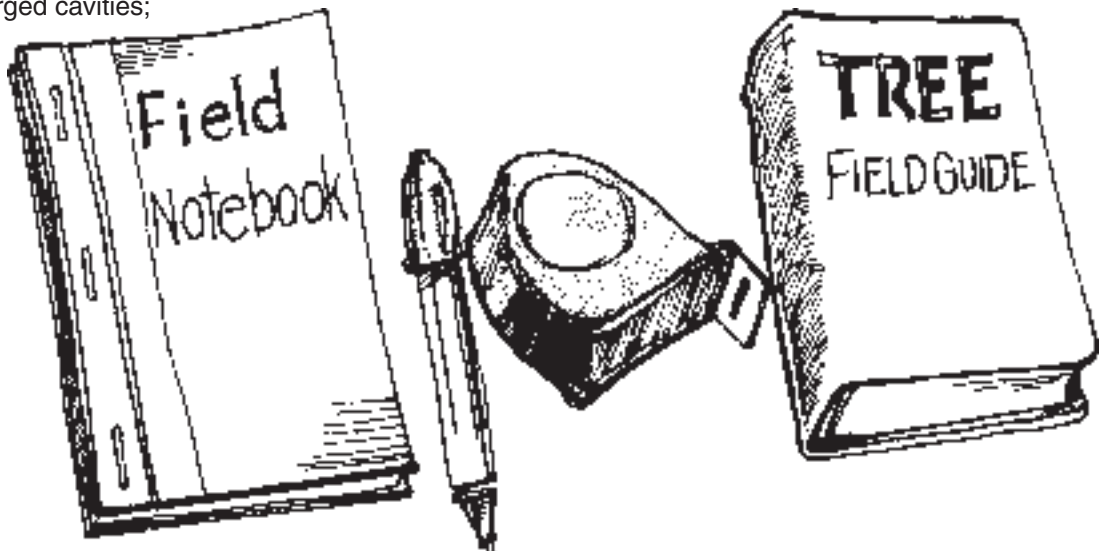
We don't have to look far for examples of widespread tree disease. The chestnut blight (*Endothia parasitica*) wiped out most of our American chestnut trees in the early 1900's. First noticed in the 1980's, a fungus disease called dogwood anthracnose attacked and killed flowering dogwood trees from New England south into the Appalachian Mountains. Butternut canker is an annual fungus introduced into the United States about 30 years ago. It inhibits the tree's reproduction and has affected butternut trees throughout the state of Kentucky. The balsam woolly adelgid was introduced from Europe and has impacted Fraser fir trees in the Great Smoky Mountains National Park and has spread into Eastern Kentucky. Dutch elm disease is another European import that has spread to American, slippery, and winged elms by the elm bark beetle as it feeds in the tree canopy. To protect itself, a healthy forest will have a variety of species.

Students will look at the forest variety found within Mammoth Cave National Park, or other selected study area, by recording observations in their field notebook. Students will be looking at and listing several different characteristics of trees observed. There are several ways to identify a tree. A tree can be categorized by its bark, twigs, leaves, the colors displayed during various seasons, its flowers, and its fruit. The leaves provide excellent clues as each tree has leaves of a distinctive size, venation, shape, and seasonal coloration. The fruit of a tree is a good indicator as each tree has its own unique fruit. Flowers are another factor in the identification of trees. Of course, flowers and fruits can only be used during the tree's flowering/fruited seasons.

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PROCEDURE:

1. The teacher gives, or has each student make, a field notebook. Notebooks should have several sheets of paper stapled or bound together. Cardboard covers can provide a firm writing surface. Each student should have a pen.
2. The teacher divides the class into groups of three or four students each. Give each group a tape measure and one copy of *Kentucky Forest Trees: How to Know Them (FOR-1), or any other tree field guide.
3. The students will go into a wooded area and choose one tree to observe and identify in their notebooks. The teacher should instruct students to stay within pre-selected boundaries. Indicate boundaries that allow the instructor to see and assist each group.
4. The students are to work as a group to collect their information and observations, but each student needs to record data individually. Instruct students to complete the following activities at their tree:
 - Make a bark rubbing
 - Draw the leaf
 - Draw the fruit (if present)
 - Draw the flower (if present)
 - Measure and record circumference of tree
 - Record evidence of and number of birds found in the tree
 - List animals seen or clues of animal activity discovered around the tree. (Clues may include nut remnants; footprints; guano piles; rubbed, drilled or eaten bark; enlarged cavities; oak galls; holes or leaf-miner designs on leaves; descriptions of old or new bird/squirrel nests; size and color of egg shells, etc.)
 - Write the scientific and common name of the tree obtained from their field guide book
5. After every student has completed their research and recorded their data into their field notebook, the teacher instructs each group to move to a new and different tree. Continue as before until the group has researched and recorded three different trees (or as many trees as time permits).
6. If sufficient field guides are not available in the forest, provide time in the classroom or library for students to use a field guide to identify their trees.
7. After identifying their trees, the teacher should explain that information has no value to the scientific community if it is kept secret. For this reason, scientists hold conferences to share their knowledge. The teacher tells the class they will now participate in a science conference.
8. Have each group present and discuss their findings to the class. The teacher explains that scientist like to really understand not only what was discovered but also how it was discovered. They like to ask questions. At their conferences, scientist will question each other about methodology, data collection techniques, and recording methods, as well as findings. Encourage questions during and after each presentation.



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CLOSURE: Today we had a glimpse of what it is like to be a scientist. We used field guides and our senses to make accurate observations of selected trees. We learned how to keep a scientific notebook and how to share this knowledge with others. Through these methods we learned about some of the trees found in and around Mammoth Cave National Park.

EVALUATION: Teachers are able to evaluate each student's involvement and participation within their individual group and during the class science conference. Teachers are able to evaluate each student's ability to follow directions and complete all components of the assignment by looking at the completeness of their scientific notebooks.

EXTENSIONS:

1. Perform a forest density study.
2. Approximate the height of the trees studied.
3. Create a scientific notebook of trees found around your school or home.
4. Create a scientific notebook of plants found around your school or home.

**NOTE: Kentucky Forest Trees: How to Know Them (FOR-1) by Dr. Deborah B. Hill and Diana L. Olszowy can be obtained from the University of Kentucky, College of Agriculture, Cooperative Extension Service, Lexington, Kentucky for a nominal fee.*

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CORE CONTENT

- PL-M-3.3.2** Improving environmental conditions (e.g., air and water quality) and preserving natural resources impact personal and community health.
- PL-M-3.1.5** Environmental issues (e.g., pollution) should be considered when making consumer decisions (e.g., recycling, reducing, reusing).
- SC-M-3.5.3** For most ecosystems, the major source of energy is sunlight. Energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis. That energy then passes from organism to organism in food webs.
- SC-M-3.5.2** Populations of organisms can be categorized by the function they serve in an ecosystem. Plants and some microorganisms are producers because they make their own food. All animals, including humans, are consumers, and obtain their food by eating other organisms. Decomposers, primarily bacteria and fungi, are consumers that use waste materials and dead organisms for food. Food webs identify the relationships among producers, consumers, and decomposers in an ecosystem.
- SC-M-3.5.1** A population consists of all individuals of a species that occur together at a given place and time. All populations living together and the physical factors with which they interact compose an ecosystem.
- SC-M-3.4.1** Biological change over time accounts for the diversity of species developed through gradual processes over many generations. Biological adaptations include changes in structures, behaviors, or physiology that enhance survival and reproductive success in a particular environment.
- SC-M-3.2.1** All organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.
- WR-M-1.4** Transactive writing is informative/persuasive writing that presents ideas and information for authentic audiences to accomplish realistic purposes like those students will encounter in their lives. In transactive writing, students will write in a variety of forms such as the following:
- letters
 - speeches
 - editorials
 - articles in magazines, academic journals, newspapers
 - proposals
 - brochures
 - other kinds of practical/workplace writing.
- Characteristics of transactive writing may include :
- text and language features of the selected form
 - information to engage/orient the reader to clarify and justify purposes
 - ideas which communicate the specific purpose for the intended audience
 - explanation and support to help the reader understand the author's purpose
 - well-organized idea development and support (e.g., facts, examples, reasons, comparisons, anecdotes, descriptive detail, charts, diagrams, photos/pictures) to accomplish a specific purpose
 - effective conclusions.