Forestry Suppliers Lesson Plan

Tree Study

Forestry Suppliers' Tree Study F.I.E.L.D. Kit™
Fundamental Investigation of the Environment Leading to Discovery™
Study Kit Correlated to National Science Education Content Standards

If you're interested in tree studies for classroom activities, consider the Forestry Suppliers' Tree Study F.I.E.L.D. Kit. Use the kit for the exercises outlined in this Lesson Plan, as well as other related activities (see "Further Studies" section for a few ideas).

This F.I.E.L.D. Kit is available exclusively from Forestry Suppliers and includes some of the items used in this lesson plan. All kit items may also be purchased individually. Call our Sales Department at 1-800-647-5368 or visit us on the web at www.forestry-suppliers.com.

Fields of Study:

- Biology
- Forestry
- History
- Mathematics

National Science Education Content Standards Correlation

Grades	A	B	C	D	E	F	G
K-4	✓		✓		✓		✓
5-8	✓		✓			✓	✓
9-12	✓					✓	✓

Tree Study Kit Contents Stock Number 36849		Required For This Lesson Plan			
Qty.	Description	K-4	5-8	9-12	Stock Number
1	Increment Borer - 8″, 3-Thread	✓	✓	✓	63081
1	Tangent Height Gauge				36953
1	Diameter Tape	✓	✓	✓	39480
1	Tree Finder Book				94711
1	Doyle Tree and Log Scale Stick	✓	✓	✓	59750
1	100' Tape				40057
1	Increment Core Holders, Pack of 10	✓	✓	✓	63395
3	Enviro Flagging, Blue				58036
3	Enviro Flagging, Orange				58037
1	Stake Flags, Blue				39287
1	Stake Flags, Orange				39288
6	English/Metric Ruler - 12″/30cm Long				47460
6	Tree Cookies, Pack of 6				36858
6	Handheld Magnifiers				61233

Grades K-4

Background

In a group of similar trees, are the tallest trees really the oldest? Since some trees are naturally taller than others are, several factors must be considered. Pine, oak, sweet gum, cottonwood, Douglas fir and the giant sequoia are all examples of tall trees. Trees that when full-grown are not very tall include the apple tree, peach tree, hackberry, elm, Osage orange and horseapple. To determine if there is a correlation between age and height, several factors must be considered. The height of the tree must first be found. This can be done by using a clinometer or a tangent height gauge. The diameter of the tree must also be determined.

Next, a core sample must be taken and viewed to determine the actual age of the tree. When studying a core, you will notice that the wood has light and dark bands. These are used to determine the age of the tree. Just as the growth rings of a tree are visible in a crosscut log, each light or dark band visible on the core represents a year in the life of a tree. The light bands are the springwood that the tree added during the growing season in spring. The dark bands beside each light band represent the late summer and fall growing season for each tree. Trees grow very little if any during the cold months of winter.

When studying trees it is important to consider the total value of the tree. All trees are valuable. Trees are a very important part of many ecosystems and our total environment. Some trees are valued because of the great beauty that they add to the forest or landscape. Other trees provide a much needed home or niche for certain small animals or insects. Particular trees yield compounds or substances that are used as medicines and in chemical products. Specific types of trees are used to build our homes and other wood structures and products. Tree farmers and foresters need to know the market value of the trees that are used to supply wood for human use. Much consideration must be given to the cutting of trees prior to the actual cutting. Experienced and knowledgeable foresters can best determine which trees should be harvested. A Tree and Log Scale Stick may be used for many applications including diameter measurements, determining merchantable tree height and finding volumes for standing and felled trees. Even younger students need to understand the basics of determining the age and value of a specific tree. Understanding this can truly make students of all ages better stewards of our environment.

Procedure

1. In a group of similar trees, are the tallest trees necessarily the oldest? To study this, locate 4 to 7 trees of the same species growing near each other that are no more than 14 inches in diameter. (Note: Before you bore trees on private property, be sure to obtain the permission of the landowner.)
2. Measure the heights of the trees using a clinometer, a tangent height gauge or a classroom-made height finder. (Older students will be able to follow the instructions given on the tangent height gauge.)
3. Measure the diameter of the trees using a diameter tape or a log scale stick. (Older students will be able to use the log scale stick on their own; refer to Correlated Lesson Plan for grades 5-8 for detailed use of a Tree and Log Scale Stick.)
4. Capture a core sample using an increment borer. Bore the tallest tree at about 4.5 feet above the ground. Teachers may need to assist students in lower grades in obtaining the core sample.
5. Store the core in an increment core holder or in a standard soda straw. Be sure to label the sample appropriately and to handle the cores very carefully so that they don't break.
6. Count the rings on the bored trees. When counting the rings it is helpful to use a pen or marker to note every five or ten rings on older trees. If the rings are difficult to see wet them with water or rub lightly with a highlighter pen or a light-colored marker.
7. Once the rings are counted, 5 to 10 years is often added to the total age of a tree. This makes allowance if the very center of the tree is missed during boring. For this exercise, add 8 years to the age of each tree.
8. Next, examine the last ten years of growth rings (closest to the borer handle) for each tree. This is a gauge of how well the tree is growing now.
9. Compare these rings with the first and middle 10 years of growth.
10. When you are through with the cores, return them back into the tree. This will help deter rot and insect invasion of the tree.
11. Use the Data Collection Sheet provided to record your results. For additional study and to introduce new hypotheses, repeat the exercise for other tree species on your site.

Further Studies

- Students will list the most commonly found trees within the area that they are observing.
- Students will complete library or Internet research, finding facts about trees that grow tallest within a given period of time.
- Students will attempt (with their teacher's help) to locate the oldest and tallest tree within a second group or stand of trees using the procedure used in the first study.
- Students will compare differing characteristics between hard and soft woods when presented with tree cookies of hard and soft wood.

Rubric

- Students will be able to explain the value of various species of trees.
- Students will list trees that are considered tall or short at maturity.
- Students will demonstrate how an increment borer is used.
- Students will demonstrate how a tree height tangent and a clinometer are used. (3-4)

Assessment

- The teacher will have the students prepare a storyboard explaining why taller trees are not necessarily the oldest trees.
- The teacher will provided sample cores and have students judge the age of the tree from the sample.
- The teacher will have the students use the tree height tangent in determining the height of a flagpole, another type of pole or a tree present on the school playground or campus. (3-4)

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Content Standards Covered

A Science as inquiry
- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

C Life Science
- Characteristics of organisms
- Life cycles of organisms

E Science and Technology
- Abilities of technological design
- Understandings about science and technology

G History and Nature of Science
- Science as a human endeavor

Additional Materials Needed

Supplied by Teacher/Student(s)

- Data Collection Sheet
- Clear Straws

Optional Items

Optional items available from Forestry Suppliers that can be used to enhance this lesson plan.

- Tangent Height Gauge **36953**
- Increment Core Holder **63395**
- Clinometer **43830**

Grades 5-8

Background

When studying trees, it is important to consider the total value of the tree. All trees are valuable. Trees are a very important part of many ecosystems and our total environment. A forest provides an efficient cooling system as the trees and plants respire or release amounts of water and produce oxygen. Understanding what trees need for optimum growth and health is essential in maintaining a balance in our environment. Some trees are valued because of the great beauty that they add to the forest or landscape. Other trees provide much needed homes or niches for certain small animals or insects. Particular trees yield compounds or substances that are used as medicines and in chemical products. These trees are part of complex ecosystems, which are sustained by the continual presence of all species.

Specific types of trees are used to build our homes and other wood structures and products. Tree farmers and foresters need to know the market value of the trees that are used to supply wood for human use. Much consideration must be given to the cutting of trees prior to the actual cutting. Experienced and knowledgeable foresters can best determine which trees should be harvested. A Tree and Log Scale Stick may be used for many applications including diameter measurements, determining merchantable tree height and finding volumes for standing and felled trees. Even younger students need to understand the basics of determining the age and value of a specific tree. Understanding this can truly make students of all ages better stewards of our environment.

In a group of similar trees, are the tallest trees really the oldest? Since some trees are naturally taller than others are, several factors must be considered. Pine, oak, sweet gum, cottonwood, Douglas fir and the giant sequoia are all examples of tall trees. Trees that when full-grown are not very tall include the apple tree, peach tree, hackberry, elm, Osage orange and horseapple. To determine if there is a correlation between age and height, several factors must be considered. The height of the tree must first be found. This can be done by using a clinometer or a tangent height gauge. The diameter of the tree must also be determined.

A core sample must be taken and viewed to determine the age of the tree. When studying a core, you will notice that the wood has light and dark bands. These are used to determine actual the age of the tree. Just as the growth rings of a tree are visible in a crosscut log, each light or dark band visible on the core represents a year in the life of a tree. The light bands are the springwood that the tree added during the growing season in spring. The dark bands beside each light band represent the late summer and fall growing season for each tree. Trees grow very little if any during the cold months of winter.

Procedure

1. In a group of similar trees, are the tallest trees necessarily the oldest? To study this, locate 4 to 7 trees of the same species growing near each other that are no more than 14 inches in diameter. (Note: Before you bore trees on private property, be sure to obtain the permission of the landowner.)
2. Measure the heights of the trees using a clinometer, a tangent height gauge or a classroom-made height finder. (Older students will be able to follow the instructions given on the tangent height gauge.)
3. Measure the diameter of the trees using a diameter tape or a log scale stick. (Older students will be able to use the log scale stick on their own.)
4. Capture a core sample using an increment borer. Bore the tallest tree at about 4.5 feet above the ground. Teachers may need to assist students in lower grades in obtaining the core sample.
5. Store the core in an increment core holder or in a standard soda straw. Be sure to label the sample appropriately and to handle the cores very carefully so that they don't break.
6. Count the rings on the bored trees. When counting the rings, it is helpful to use a pen or marker to note every five or ten rings on older trees. If the rings are difficult to see, wet them with water or rub lightly with a highlighter pen or a light-colored marker.
7. Once the rings are counted, 5 to 10 years is often added to the total age of a tree. This makes allowance if the very center of the tree is missed during boring. For this exercise, add 8 years to the age of each tree.
8. Next, examine the last ten years of growth rings (closest to the borer handle) for each tree. This is a gauge of how well the tree is growing now.
9. Compare these rings with the first and middle 10 years of growth.
10. When you are through with the cores, return them back into the tree. This will help deter rot and insect invasion of the tree.
11. Use the Data Collection Sheet provided to record your results. For additional study and to introduce new hypotheses, repeat the exercise for other tree species on your site.

Further Studies

- Students may make comparisons among different species of trees concerning the merchantable value. These observations can be made within their own school or home environment. A field study may be necessary if a forested area is not present within the school setting.
- Students can calculate felled log volume and value by using the Tree Scale Stick.
- Students will compare differing characteristics between hard and soft woods when presented with tree cookies of hard and soft wood.

Rubric

- Students should be able to measure the diameter of a pole or tree using a tree height tangent.
- Students should be able to determine: tree diameter, merchantable tree height, and volume of tree in board feet.
- Students should be able to determine the board foot volume of a tree that has been felled and cut.

Assessment

- Students will be quizzed concerning how the age of a tree is determined.
- Students will be expected to give the age of a tree if supplied with a core sample as well as give other characteristics that can be determined from such a sample.
- Students will explain how to determine the merchantable value of a tree.
- Students will give examples of trees which, at maturity, are tall or short.

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Content Standards Covered

A Science as inquiry
- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

C Life Science
- Structure and function in living systems

F Science in Personal and Social Perspectives
- Populations, resources and environments

G History and Nature of Science
- Science as a human endeavor
- History of science

Additional Materials Needed

Supplied by Teacher/Student(s)

- Data Collection Sheet
- Clear Straws

Optional Items

Optional items available from Forestry Suppliers that can be used to enhance this lesson plan.

- Tangent Height Gauge **36953**
- Increment Core Holder **63395**
- Clinometer **43830**

Grades 9-12

Background

When studying trees, it is important to consider the total value of the tree. All trees are valuable. Trees are a very important part of many ecosystems and our total environment. A forest provides an efficient cooling system as the trees and plants respire or release amounts of water and produce oxygen. Understanding what trees need for optimum growth and health is essential in maintaining a balance in our environment. Some trees are valued because of the great beauty that they add to the forest or landscape. Other trees provide much needed homes or niches for certain small animals or insects. Particular trees yield compounds or substances that are used as medicines and in chemical products. These trees are part of complex ecosystems, which are sustained by the continual presence of all species.

Specific types of trees are used to build our homes and other wood structures and products. Tree farmers and foresters need to know the market value of the trees that are used to supply wood for human use. Much consideration must be given to the cutting of trees prior to the actual cutting. Experienced and knowledgeable foresters can best determine which trees should be harvested. A Tree and Log Scale Stick may be used for many applications including diameter measurements, determining merchantable tree height and finding volumes for standing and felled trees. Even younger students need to understand the basics of determining the age and value of a specific tree. Understanding this can truly make students of all ages better stewards of our environment.

In a group of similar trees, are the tallest trees really the oldest? Since some trees are naturally taller than others are, several factors must be considered. Pine, oak, sweet gum, cottonwood, Douglas fir and the giant sequoia are all examples of tall trees. Trees that when full-grown are not very tall include the apple tree, peach tree, hackberry, elm, Osage orange and horseapple. To determine if there is a correlation between age and height, several factors must be considered. The height of the tree must first be found. This can be done by using a clinometer or a tangent height gauge. The diameter of the tree must also be determined.

A core sample must be taken and viewed to determine the age of the tree. When studying a core, you will notice that the wood has light and dark bands. These are used to determine actual the age of the tree. Just as the growth rings of a tree are visible in a crosscut log, each light or dark band visible on the core represents a year in the life of a tree. The light bands are the springwood that the tree added during the growing season in spring. The dark bands beside each light band represent the late summer and fall growing season for each tree. Trees grow very little if any during the cold months of winter.

Procedure

1. In a group of similar trees, are the tallest trees necessarily the oldest? To study this, locate 4 to 7 trees of the same species growing near each other that are no more than 14 inches in diameter. (Note: Before you bore trees on private property, be sure to obtain the permission of the landowner.)
2. Measure the heights of the trees using a clinometer, a tangent height gauge or a classroom-made height finder.
3. Measure the diameter of the trees using a diameter tape or a log scale stick. (Older students will be able to use the log scale stick on their own.)
4. Capture a core sample using an increment borer. Bore the tallest tree at about 4.5 feet above the ground.
5. Store the core in an increment core holder or in a standard soda straw. Be sure to label the sample appropriately and to handle the cores very carefully so that they don't break.
6. Count the rings on the bored trees. When counting the rings, it is helpful to use a pen or marker to note every five or ten rings on older trees. If the rings are difficult to see, wet them with water or rub lightly with a highlighter pen or a light-colored marker.
7. Once the rings are counted, 5 to 10 years is often added to the total age of a tree. This makes allowance if the very center of the tree is missed during boring. For this exercise, add 8 years to the age of each tree.
8. Next, examine the last ten years of growth rings (closest to the borer handle) for each tree. This is a gauge of how well the tree is growing now.
9. Compare these rings with the first and middle 10 years of growth.
10. When you are through with the cores, put them back into the tree. This will help deter rot and insect invasion of the tree.
11. Use the Data Collection Sheet provided to record your results. For additional study and to introduce new hypotheses, repeat the exercise for other tree species on your site.

Further Studies

- Students may make comparisons among different species of trees concerning the merchantable value. These observations can be made within their own school or home environment. A field study may be necessary if a forested area is not present within the school setting.
- Students can calculate felled log volume and value by using the Tree Scale Stick. Comparisons should be made using different tree species.
- Students may complete library research to determine what species of tree has historically had the highest merchantable value.
- Students may complete research concerning rainforest tree species that produce known medicinal compounds.
- Students will compare differing characteristics between hard and soft woods when presented with tree cookies of hard and soft wood.

Rubric

- Students should be able to measure the diameter of a pole or tree using a tree height tangent.
- Students should be able to determine tree diameter, merchantable tree height, and volume of tree in board feet.
- Students should be able to determine the board foot volume of a tree that has been felled and cut.
- Students should be able to categorize tree species as tall or short at maturity.
- Students should be able to use a clinometer and make accurate measurements.

Assessment

- Students will be asked to give the steps in determining the age of a tree.
- Students will be expected to give the age of a tree if supplied with a core sample as well as give other characteristics that can be determined from such a sample, such as possible information concerning the moisture availability during a particular year.
- Students will explain how to determine the merchantable value of a tree.
- Students should be familiar with the merchantable value of local species of trees.

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Content Standards Covered

A Science as inquiry
- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

F Science in Personal and Social Perspectives
- Natural Resources
- Environmental Quality

G History and Nature of Science
- Science as a human endeavor
- Historical perspectives

Additional Materials Needed

Supplied by Teacher/Student(s)

- Data Collection Sheet
- Clear Straws

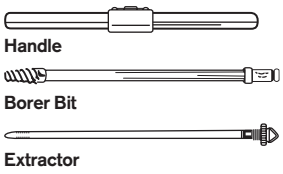
Optional Items

Optional items available from Forestry Suppliers that can be used to enhance this lesson plan.

- Tangent Height Gauge **36953**
- Increment Core Holder **63395**
- Clinometer **43830**

Using an Increment Borer

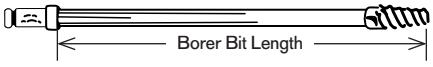
The Increment Borer is essential for extracting a core of wood from trees, logs, poles or timbers. The core extracted is used for many purposes including determination of growth rate, age, tree soundness, penetration of chemicals in the wood treating business, and specific gravity studies of wood.



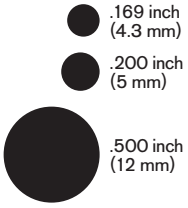
An increment borer consists of three parts: a handle, a borer bit, and an extractor. When not in use, the borer bit and extractor fit inside the handle and form a compact unit. Most increment borers have Teflon® coated bits. This coating helps reduce friction, protects against rust, and keeps the bit clean to extend bit life.

Making the Right Selection

There are three things to consider when you choose an increment borer. They are length, diameter, and style.



Borer bit length depends on the size of the trees you will be boring. Length is measured from the tip of the threads to the end of the round section of the borer bit. This is the maximum depth the bit will penetrate.



Core Diameter of the wood sample is determined by the inside diameter of the opening at the threaded end of the bit. .169″ is commonly used for general forestry use, .200″ for wood preserving testing and .500″ for large amounts of wood for qualitative analysis.

2- or 3-Thread style is a matter of personal preference. A 2-thread borer has two threads on the cutting edge of the bit, each originating 180° apart.

A 3-thread borer has three threads, each originating 120° apart. The 3-thread borer, due to its higher pitch, will penetrate the wood deeper per revolution than a 2-thread and also produce less friction because more threads are pushing against the wood.

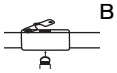
It is important to remember, the ease at which a borer penetrates wood depends on wood hardness, friction properties and capability/strength of the user.

Taking an Increment Core

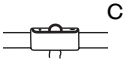
Follow these seven steps to take a core:

1. Remove the borer bit and extractor from inside the handle. Place the extractor in a pocket of your cruiser vest for convenience and protection of the extractor.
2. Assemble the handle and borer bit by:

A Pushing the locking latch away from the handle with your thumb



B Inserting the square end of the borer bit into the handle, then



C Returning the locking latch completely around the borer bit "collar."

You're now ready to start boring. However, we suggest you apply beeswax to the threads and shank before you begin.

3. Align the borer bit and the handle so that the bit will penetrate through or towards the center of the tree and at right angles to the tree. In any other alignment, the annual growth rings seen in the extracted core will be distorted and could result in erroneous growth rate analysis.

4. Place the borer bit threads against the tree (Fig.1), preferably in a bark fissure where the bark is thinnest.

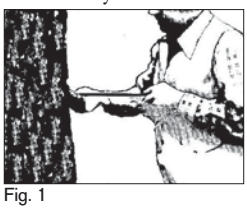


Fig. 1

Hold the threads in place with one hand. With your other hand, push forward on the handle and simultaneously turn it clockwise until the bit threads penetrate the wood enough to hold the bit firmly in place.

5. Place both hands, palms open, on the ends of the handle and turn the handle clockwise until the bit reaches the desired depth (Fig. 2).


Fig. 2

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800-430-5566
If you need more information or would like advice from an experienced professional, call our Technical Support team.

Sales
800-647-5368
Our sales department will gladly fax you an order form, update you on pricing, or take your order over the phone.

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www.forestry-suppliers.com
205 West Rankin Street
Jackson, MS 39201

WD041000 5/04-3M

6. With the bit at the desired depth, insert the full length of the extractor, concave side down "◠" (Fig. 3).


Fig. 3

Then turn the handle one-half turn counterclockwise to break the core from the tree and also to turn the extractor concave side up like this: "◡."

7. Pull the extractor from the borer bit (Fig. 4). The core will be resting in the channel and held in place by the small "teeth" at the tip of the extractor. Before examining the core sample, promptly remove the borer bit from the tree. Clean it and place it and the extractor back in the handle.


Fig. 4

Care and Maintenance

Follow these suggestions to maintain the efficiency and extend the life of your increment borer.

Lubricate with Beeswax

A block of beeswax is provided with every increment borer. Penetration and removal of the borer bit will be easier if beeswax is liberally applied to the threads and shank before each boring.

Clean with WD-40

WD-40 is an excellent cleaner and rust preventative for an increment borer. It will also prevent sap acid-etching of the borer. Spray it on as well as inside the bit and on the extractor at the end of each working day. Wipe clean.

Be Quick!

Obtain your core samples as rapidly as possible. It's best to remove the bit from the tree even before examining the core sample. This will reduce the possibility of the bit becoming stuck or locked in the tree.

Avoid Compression & Tension Wood

Never bore into suspected compression or tension wood. To explain: a tree leaning towards the North will have compression wood on the North side. If you bore into compression wood, the bit could be locked into the tree by the force of the "compressed" wood. If you bore into the South side, you are boring into "tension" wood, where the ring width may not be representative. We recommend boring on the East or West side, or if possible, select another tree.

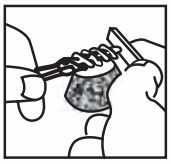
Increment Borer Sharpening

Increment borers become dull or nicked with use. A borer is dull if it does not easily engage the wood and if it will not cut a clean-edged hole when rotated on a sheet of paper.

How to Sharpen Borer Bits

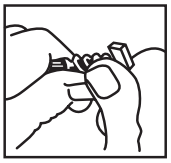
See Increment Borer Sharpening Kit for stones described here.

1. True Cutting Edge Using Pocket Stone



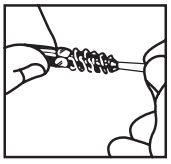
If cutting edge is uneven when placed lightly against a flat surface, it needs to be trued up. Place a few drops of oil on wide face of pocket stone. Hold borer bit steady on cork rest and pass stone back and forth across cutting edge, turning bit slightly after each pass. Repeat until true.

2. Sharpen Cutting Edge Using India Stone



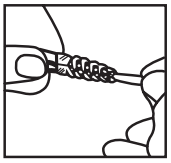
Holding bit in left hand and India stone in right hand, slowly rotate bit away from you and against stone while holding stone parallel to and firmly on beveled edge of bit. Continue until sharp. If nicks are present, use pocket stone to work them out, then follow with the India stone.

3. Hone Inside of Cutting Edge Using Conical Stone



Put a few drops of oil on conical stone and insert tip of stone into cutting end of bit until it occupies about 3/4ths of core hole. Very lightly rotate stone against inside of cutting edge, keeping the edge of the stone parallel to the long axis of the bit.

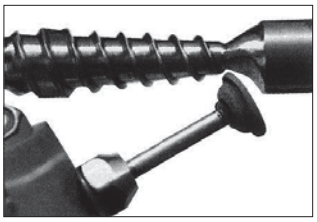
4. Hone Outside Beveled Portion of Cutting Edge Using Conical Stone



Hold borer bit with threads on cork rest and place just the tip of conical stone on and parallel to bevel. Use very light strokes back and forth over a small arc of beveled edge. Turn bit and repeat until entire edge has been honed. To test sharpening, cut circular holes in a sheet of paper.

Increment Borer Sharpening Kit

Includes everything needed to sharpen borers: India Stone to sharpen lead cutting edge; Conical Stone to sharpen inside cutting edge, outside beveled edge; Pocket Stone to "true" cutting edge, remove chips and nicks; can of Sharpening Stone Oil to lubricate, clean stones; and Cork to use as a work rest. To order, specify number 63399, Sharpening Kit.



Professional Increment Borer Repair Service

Extend the life of your increment borer. Have the cutting edge sharpened, threads reshaped near cutting tip, and nicks removed. Your bit will be returned to you in "like-new" condition. Note: Nicks, chips and cracks greater than 1/16" deep cannot be repaired. For more information, call our Customer Service Department toll-free at (800) 752-8460.

Worksheet

Student Name: _____ **Date:** _____

	Tree #1	Tree #2	Tree #3	Tree #4	Tree #5	Tree #6	Tree #7
Height (inches)	_____	_____	_____	_____	_____	_____	_____
Diameter (inches)	_____	_____	_____	_____	_____	_____	_____
Total Age (from core + 8)	_____	_____	_____	_____	_____	_____	_____
Core Growth	_____	_____	_____	_____	_____	_____	_____
Length of first 10 years (inches)	_____	_____	_____	_____	_____	_____	_____
Length of middle 10 years (inches)	_____	_____	_____	_____	_____	_____	_____
Length of last 10 years (inches)	_____	_____	_____	_____	_____	_____	_____

Conclusions and Questions	**Yes**	**No**
1. Does the tallest tree have the largest diameter?	☐	☐
2. Did the tallest tree have the longest core length during its first ten years?	☐	☐
3. Did the tallest tree have the longest core length during its middle ten years?	☐	☐
4. Did the tallest tree have the longest core length during its last ten years?	☐	☐
5. How many dark rings did you count from the bark to the center ring?	☐	☐
6. Was the tree alive when World War II ended?	☐	☐
7. Was the tree alive when you were born?	☐	☐

Year you were born _____

8. How many inches did your borer have to travel to reach the center of the tree? _____

9. Does this have any relationship to its diameter?	☐	☐
10. Does taller also mean older?	☐	☐

If yes, what is it? _____

Why/why not? _____

_____

_____

11. List any other conclusions you determined: _____

_____

_____

_____