

Lesson Outline for ALEX

General Lesson Information

Title: *Can Trees Tell a Story?*

Overview/Annotation- *Tree rings can tell a story to scientists, simply by looking at the size and number of rings. This field, known as dendrochronology, is widely used to examine climate patterns from the past, and used to inform policy decisions today. In this lesson, students will be introduced to the idea of trees as living objects that grow, and how the growth of the tree is influenced by the amount of water it receives each year/growing season. By counting and comparing tree rings, mathematics and science principles are integrated into this lesson plan. This lesson plan was created through the SCIREN program at the University of Alabama, and forms the foundation for future lesson plans in dendrochronology at higher grade levels.*

Setting or format (outdoors, in groups, lab, etc.): Indoor

Intended group size (if groups are used): NA

Intended grade level(s): *Kindergarten*

Approximate Time of Lesson (*Ideally break down into 20-50 minute periods*): 50 minutes

Researcher Biography

Name & Professional Title: *Joni Corbin, PhD student*

Affiliation: *The University of Alabama, Department of Civil, Construction and Environmental Engineering*

Contact Information (Email, Twitter, Personal Website, etc.): *jcorbin@crimson.ua.edu*

Brief Description of Research Interests: *My research uses dendrochronology to identify long term climatic patterns in the southeastern United States, specifically related to drought and streamflow conditions. This paleoclimate data (some dating back to 1200 BCE) provides a better picture for potential shifts of future drought conditions.*

Associated Standards and Objectives

Content Standards-

Mathematics K-CC1 *Count to 100 by ones and tens*

Mathematics K-CC3 *Write numbers from 0 – 20. Represent a number of objects with a written numeral 0 – 20*

Mathematics K-CC6 *Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies. (Include groups with up to ten objects.)*

Science K-3 *Distinguish between living and nonliving things and verify what living things need to survive (e.g., animals need food, water and air; plants needing nutrients, water, sunlight and air).*

Science K-9 *Observe, record and share finding of local weather patterns over a period of time (e.g., increase in daily temperature from morning to afternoon, typical rain and storm patterns from season to season).*

Primary Learning Objectives-

Students will be able to associate tree rings with yearly growth and identify the age of trees based on the number of rings.

Students will be able to identify rain as a requirement for trees to grow, and correlate tree ring width with the amount of rainfall. Students will be able to discuss how much a tree will on a specific day based on the current weather.

Students will count tree rings up to ten, write the associated numeral, and be able to determine which tree is older based on comparison when given two tree samples.

Additional Learning Objectives-

Students will learn about the field of dendrochronology, and how counting tree rings can tell a story.

Preparation Information

Total Duration- *50 minutes*

Materials and Resources-

*Print out of worksheets A & B
Red and blue crayons or colored pencils, one per child
One thick and one thin marker, one per child*

Technology Resources Needed- *Youtube access, Projector or smartboard*

Background and Preparation- *Description of information (science content, use of materials, etc.) teacher and/or students will need to know prior to this lesson; list steps for any preparation prior to the lesson*

Trees are one of nature's most accurate chronologists, providing a yearly record of environmental conditions, with some trees living thousands of years. Studying trees is known as the field of dendrochronology. Their yearly growth patterns appears as rings, and can record evidence of natural disasters, including floods, forest fires and debris slides. Additionally, their yearly growth is associated with water availability, and can be used to reconstruct regional drought conditions. In the arid west (e.g., Colorado, Arizona), dendrochronology is widely used to create models that directly correlates the width of the ring to the amount of streamflow in the area. There is a more recent push to use these same techniques in the Southeast (e.g., Alabama, Florida, Georgia, Mississippi), especially in watersheds that are highly contested, like the ACF basin. The theory is, wet years create more favorable growing conditions, resulting in more tree ring growth, and a wide ring, compared to dry years, where growth is impeded, hence a thin ring. Rainfall is not the only variable necessary for trees to grow, but it is a big factor. Tree ring growth is also dependent on other factors, such as soil conditions, sunlight, temperature, location, and type of tree. This means that not all trees will have the same growth patterns, but trees of the same species in the same area will grow similarly each year. Discussions about the biology of tree growth is not needed at this point, and will be covered in later years.

Prior to this activity, teachers need to print out worksheets A & B, gather all materials, and pull up the power point as well as the youtube video found in the attachments section.

Procedures and Activities

Step-by-step description of lesson that would allow another teacher to successfully complete the lesson (suggest possible reflection or comprehension questions along with examples of correct answers or common misconceptions)

Engagement (sparking interest, introducing phenomenon, engage students' everyday experiences)

If you want to start this lesson with a story, "This Tree Counts" by Alison Formento is a good one. A link to a read along version can be found in the attachments.

Ask the silly question first...can trees tell a story? This will get a variety of responses.

Well, trees can tell a story! They grow a ring each year, and how much they grow depends on the right environment.

So, what do trees need to grow? Correct responses should include water or rain, sunlight, nutrients in the soil.

We are going to watch a video showing the insides of an actual tree. Show the youtube video from the Children's Museum of Houston. Start at timestamp 1:21 and end at timestamp 2:35.

You might want to pause after the first core is shown, so the kids can count the rings. The second core shown discuss rainy and dry season.

Main activity (suggest possible reflection or comprehension questions along with examples of correct answers or common misconceptions)

Power point:

Slide 2 – Count Together Activity

So we know that trees grow rings as they get older. Do you think trees tell time in minutes, hours or years? Answer: years. Let's count this tree together! When you get to the end, the outer part of the tree looks like a really big ring. This is called the bark. It protects the tree from things that might hurt it. What things might hurt the tree? Answers can include a flood, people, lightning, insects, another tree. There are lots of good answers.

Slide 3 – Big word time. The word is Dendrochronologist. A dendrochronologist is a scientists that looks at how trees tell their story with their tree rings. Because trees can count, they can tell us what happened each year they grew.

Slide 4 – We already heard from the video that trees grow more if they have lots of rain. This means they grow wide (or big) rings. If the tree doesn't get as much rain in a year, it won't grow as much. This means the rings are really thin (or small). Lets look at this tree. It had a lot of rain in the first two year, 3 years with little rain, and then 2 more years of a lot of rain.

Slide 5 - Coloring Lab Activity

Start off by having each child draw a dot in the middle of their paper. Next, tell students that we will be drawing our tree rings based on how much water the tree gets each year. Show them the slide of the symbols you will be using. Use this point to check that they know that a lot of rain is a big/wide ring, and a little to no rain is a small/thin ring. This will be represented by a fat marker and a thin marker. The power point has 5 slides, each with rain or sun visually represented on the slide. Before drawing the tree ring, have the students all shout out if its going to be a big ring or a little ring. The answer is on the power point, once they all come to a consensus. Once you display the answer, have them draw the ring around the center ring, using the correct marker. Repeat this step until all the rings are drawn. Then, have the students count their rings, and write the age of the tree on the paper. The tree will be 5 years old, since they drew five rings. They may add bark to the outside of their tree rings if they wish.

Alternatively, students may use worksheet A, which has a tree stump already drawn that matches the power point. If this version is used, students will color in the rings with either a red or a blue crayon or color pencil to represent rainfall (blue) or drought (red) conditions. Both versions of this activity may be conducted if you wish to extend the lesson over multiple days. The answer key is attached in the powerpoint.

Common misconceptions include getting the rain and width measurements reversed (e.g., students think drought conditions = wide ring width). Use this opportunity to reiterate that rain is necessary for trees to grow, and without rain, the plant will not grow a lot, hence a thin ring. Another common misconception students might have is to count center of the ring as a year. This is the first year of growth, so this counts as year zero. Every ring after that is a year of growth, including the bark year.

Wrap up and Reflection (wrap up activity, reflecting on learning, informal assessments of student learning)

Wrap up questions include:

- *How old was our tree?*
- *How many years did the tree have a lot of rain?*
- *How many years did the tree get not a lot of rain?*

Informal assessments of students understanding should include a discussion of the weather today. Is today a rainy day or a sunny day? If the weather stays like this, will the tree rings be wide or thin (or big/small). Both of these questions can be done informally with a raise of hands, or a thumbs up/thumbs down. An extension of this thought process would be to have students imagine if there were some rainy days and some sunny days. The expected answer would be that the tree ring size would be somewhere in the middle.

Final product/Summative evaluation (e.g. quiz, presentation, essay, etc., may occur during a later class period)

The final assessment activity is the Tree Ring Worksheet (worksheet B in the attachments). This worksheet can be done in class, or as a take home activity. This worksheet covers all the concepts covered during the lesson, including greater than/less than, counting, and ring width.

Attachments- Any materials for the lesson such as video links, worksheets, etc., listed here

[Worksheet A](#)

[Worksheet B](#)

[Power point](#)

[Children's Museum of Houston Video](#)

["This Tree Counts" Read Along Video](#)