Learning Guide

Dating Trees

We hope you enjoyed learning about dendrochronology—the study of tree rings to understand a tree's age and history. Extend your learning with this print-ready Learning Guide!

What's in this Learning Guide?

Get Set to Listen:
Check your knowledge before and after listening to the episode by determining if statements are TRUE or FALSE.

Vocabulary

Discussion Questions
CCSS.ELA-Literacy.SL.3-8.1; CCSS.ELA-Literacy.SL.3-8.3

Writing Prompts and Extension Projects
CCSS.ELA-Literacy.W.3-8.1; CCSS.ELA-Literacy.W.3-8.2; CCSS.ELA-Literacy.W.3-8.3; CCSS.ELA-Literacy.W.3-8.4; CCSS.ELA-Literacy.W.3-8.7; CCSS.ELA-Literacy.W.3-8.8

Trees Tell a Story
CCSS.ELA-Literacy.W.5-8.3.d; K-3ESS2-1-2 Earth's Systems; ; 5-ESS3-1 Earth and Human Activity; MS-LS2-1 Ecosystems: Interactions, Energy, and Dynamics; MS-ESS3-5 Earth and Human Activity

Trees, My Family, and Me
3-ESS2-1 Earth's Systems; 3-ESS2-2 Earth's Systems; MS-LS2-1 Ecosystems: Interactions, Energy, and Dynamics

Life Lessons from Trees
CCSS.ELA-Literacy.W.3-8.7; CCSS.ELA-Literacy.W.4-8.9

Additional Resources and Book List

The Children's Hour
kids public radio

https://www.childrenshour.org/dating-trees/

Get Set to Listen

1. Before listening!

Read each statement and write TRUE or FALSE based on what you already know.

2. After listening!

Based on what the experts said in the episode, write TRUE or FALSE.

Before Listening	TRUE or FALSE?	After Listening
	1. Methuselah, the oldest tree in the world, is about 5,000 years old.	
	2. Trees mostly grow in the summertime, so the ring is lighter and thicker.	
	3. Taking a core sample is very harmful to the tree, but it is worth it because we learn so much from studying tree rings.	
	4. Trees can be used to tell when an old building was built.	
	5. The furthest we can go back in time to use trees to date things is 1,000 years.	
	6. Fossilized trees can be used to learn about prehistoric climates during the time that the tree was alive.	
	7. Giant sequoia can grow up to 10 feet in diameter!	

What did you learn?

_____

_____

_____

Get set to listen.

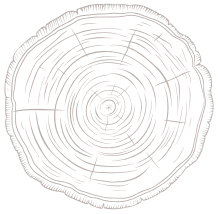
Answer key

1. TRUE
2. TRUE
3. FALSE. Taking a core sample does not harm the tree very much, as it quickly refills the hole with sap and regrows.
4. TRUE
5. FALSE. The furthest we can go back in time to use trees to date things is ***10,000*** years.
6. TRUE
7. FALSE. Giant sequoia grow up to 20-25, or even 30 feet in diameter!

Vocabulary

dendrochronology	The science of using techniques to understand the age, history, and climatic changes in the environment of a tree.
increment borer	A tool that allows for the removal of a core sample of a tree for further study, it can be done without harming the tree.
Methuselah	Believed to be one of the oldest known living trees in the world, almost 5,000 years old. This tree is a bristlecone pine and is found in Eastern California.
cross-dating	A technique that matches patterns of rings of a single tree, along with those of other trees, to gather information that helps to identify the exact year in which each ring was formed.
petrified wood	Wood from a tree that has been fossilized and preserved. When studied, it can tell scientists a lot about its life.
fire scars	A dark mark left on a tree's rings after a fire damages part of the tree, showing where it survived the burn.
climate	The average weather conditions in a place over a long period of time, usually 30 years or more.

Discussion Questions



1. How can tree rings act like a “history book” of the tree’s life?
2. What kinds of things do you think tree rings can tell us about the past?
3. Why might scientists want to study trees that are thousands of years old?
4. How do you think a tree feels when it survives through storms, fires, or droughts?
5. What can trees teach us about being strong and resilient in our own lives?
6. Do you think it’s important to protect very old trees like Methuselah? Why or why not?
7. How can tree rings help us understand climate change over hundreds or even thousands of years?
8. What might scientists learn about past droughts, floods, or fires from tree ring patterns?
9. In what ways could tree ring studies help explain events in human history, such as crop failures, migrations, or the fall of civilizations?
10. Should scientists take core samples from very old trees, even if it risks harming them? Why or why not?
11. How might protecting ancient forests help future generations of scientists and communities?

Group Discussion Strategies

Think Pair Share:
1. Individually, student writes down their answer to a question.
2. Students pair up and tell each other their answers.
3. Teacher calls for volunteers to share with the whole class their answer (and/or their partner’s answer). Teacher notes key words/phrases on board.

Round Robin:
1. Teacher poses one question (written on top of a large page) to students, who are assembled into small groups of 3 or 4.
2. Students take turns brainstorming the answers. The recorder of the group writes down all answers.
3. The leader reads the group’s ideas to the entire class. Teacher moderates.

Writing Prompts

Narrative Prompts

1. Imagine you are Methuselah, the bristlecone pine. Tell the story of what you've seen over 5,000 years.
2. A scientist discovers a tree ring that tells of a great drought 500 years ago. Write a story about what happened during that time.
3. Write a poem from the perspective of a tree, describing what it "saw" during its lifetime.

Extensions:

- Illustrate a timeline of your tree's "life story."
- Record your narrative as an audio diary from the tree's perspective.
- Draw a picture of your tree with rings showing the events you wrote about.

Informative/Explanatory Prompts

1. Explain how tree rings can tell us if a year was rainy, dry, hot, or cold.
2. Explain how **cross-dating** is used to tell the age of old buildings.
3. Compare tree rings to a diary. How are they alike and different?

Extensions:

- Make a poster showing wide rings, thin rings, and scarred rings, with labels.
- Create a labeled diagram of a tree cross-section showing wide, thin, and scarred rings.
- Research another natural record keeper (ice cores, coral, or fossils) and compare it to dendrochronology.

Opinion/Persuasive Prompts

1. Do you think studying tree rings is more important than studying written history? Why or why not?
2. Should ancient trees like Methuselah be protected from human interference? Give reasons to support your opinion.
3. Write a persuasive essay convincing your class that dendrochronology is a vital science for understanding climate change.
4. Do you think it's important to protect very old trees? Why or why not?

Extensions:

- Create a poster or infographic persuading others to protect old-growth forests.
- Hold a debate: "Is dendrochronology the most valuable tool for understanding the past?"

Trees Tell a Story

Listen

As we heard from Dr. Brown in ***The Children's Hour's*** **episode "Dating Trees"**, trees keep a record of events that occur throughout their lifetime. Their layers of growth are shown in the rings within their trunk. The details of the rings, including the width, thickness, shape, color, and any scars or abnormalities, all relate to specific events that impacted the tree.

These are some of the things that trees can keep records of:

- **Climatic Factors**

Precipitation, sunlight, soil composition, weather, temperature

- **Natural Disasters**

Floods, hurricanes, droughts, lightning strikes, earthquakes, fires

- **Other Environmental Events**

Insect damage, fungal diseases, human activity such as cutting down trees for wood or to clear land, and starting fires

Watch

this video about how to create a tree ring diagram that tells the story of the life of a tree. Supplies needed are paper, pencil, crayons or markers.

Create

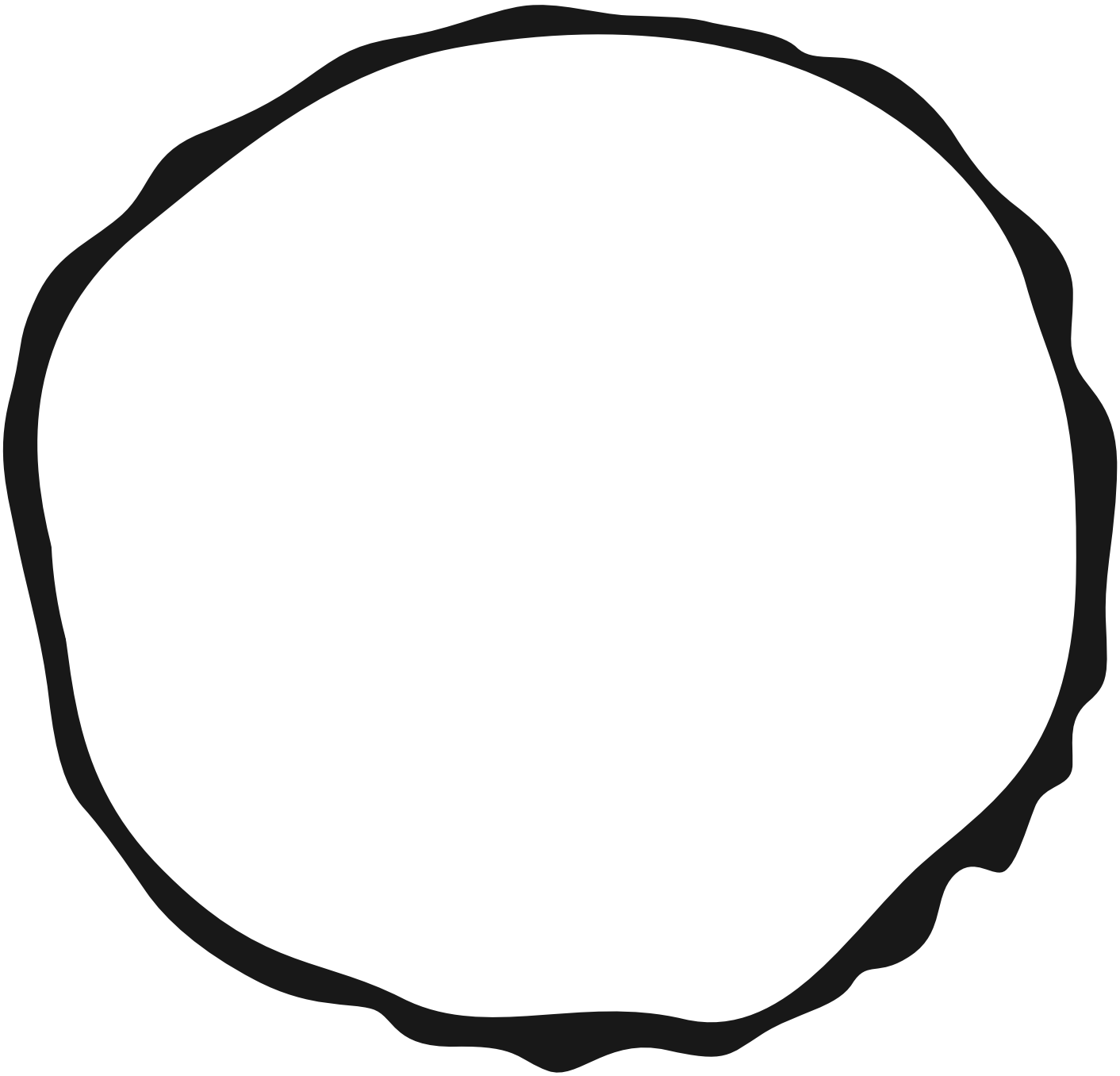
Use the "Trees Tell a Story" template to create a tree ring diagram described in the video.

Write

a poem from the perspective of a tree, describing what it "saw" during its lifetime.

"Trees connect ancient human experience to our own, through science." -National Park Service

Trees Tell a Story



My tree is _____ years old.
The climate where my tree grew is _____

Some of the events (e.g. natural disasters) that happened in the life of my tree were

_____

_____

Write

a poem from the perspective of a tree, describing what it "saw" during its lifetime.

* Adapted from the Siouxland Libraries Kids Create lesson shown in the video link

Trees, My Family, and Me

Trees tell stories and hold knowledge and wisdom within their rings. A tree's life represents the passing of time from generation to generation. Perhaps this is why many people represent the lineage of their family through a "family" tree.

Use the handouts below to create a story that shows how the lives of your family members are connected to the life of a tree.

Listen

to the song **"Great Grandmother Tree" by the Okee Dokee Brothers**

Read

Our Tree Named Steve by Alan Zweibel, illustrated by David Catrow

Show

a cross-section of a tree trunk. Ask: *"What stories do you think this tree could tell us?"*

Watch

this video to introduce dendrochronology
Briefly explain dendrochronology—wide rings = good growth, thin rings = tough years, scars = fires or storms.

Discuss

"How do we keep track of people's histories and stories?"
Introduce the idea of a family tree: just as tree rings record a tree's life, family trees record human connections and history. Use the handout to create your own family tree.

Create

a tree ring diagram and label the tree rings that correspond with dates your family members were born and other important events. For example, was it rainy the year your parents got married? Perhaps there was a thunderstorm on their wedding day. Events such as a forest fire would be significant for both the tree and your family.

Write

a story about an event from the tree's perspective as well as from your own.

"Trees connect ancient human experience to our own."
-National Park Service

Trees, My Family, and Me

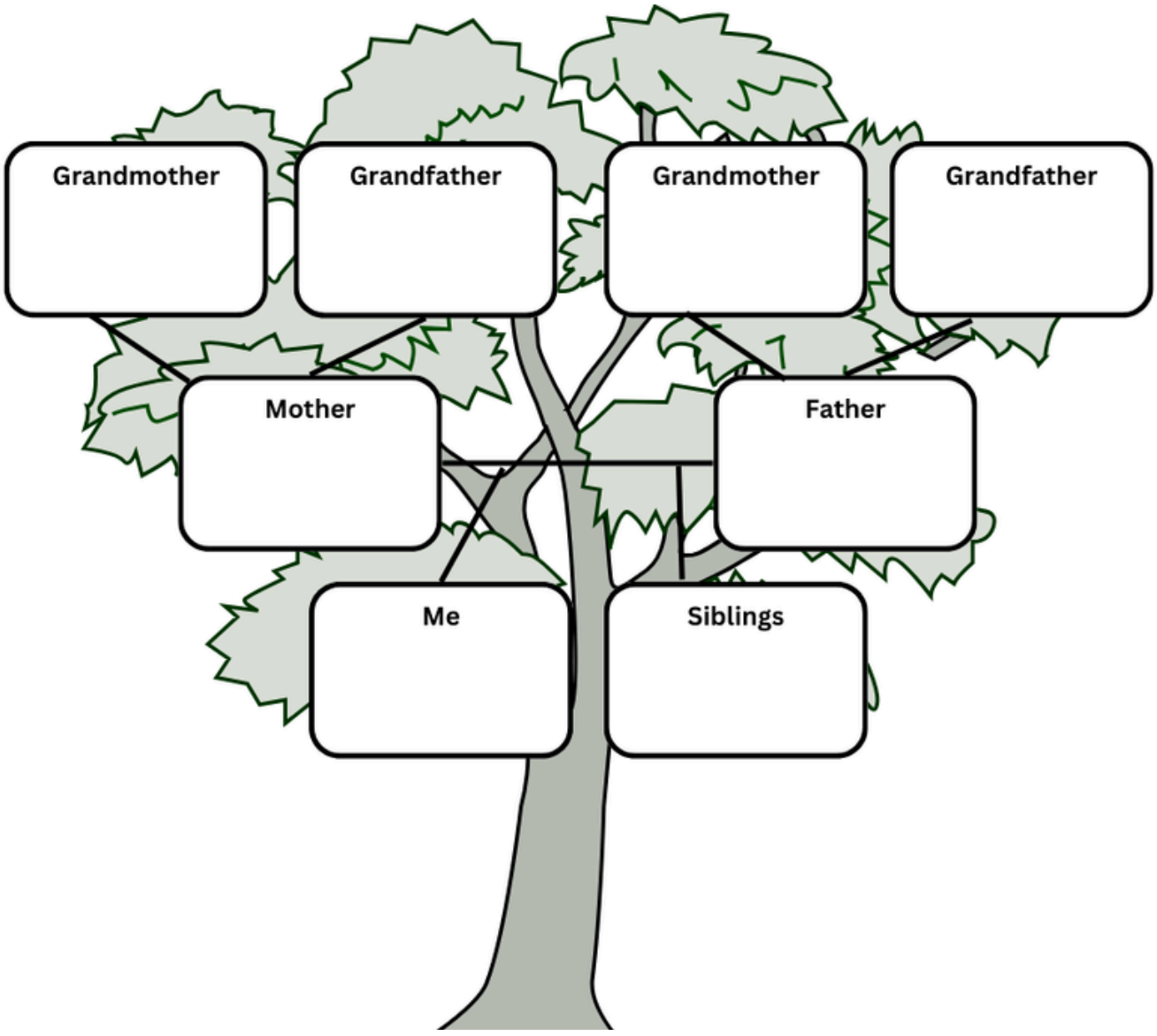
Write the names of your family members and the years of their births, marriages, and deaths (if applicable).

What other important events happened during your family's lifetime?

_____

_____

_____



"Trees connect ancient human experience to our own."
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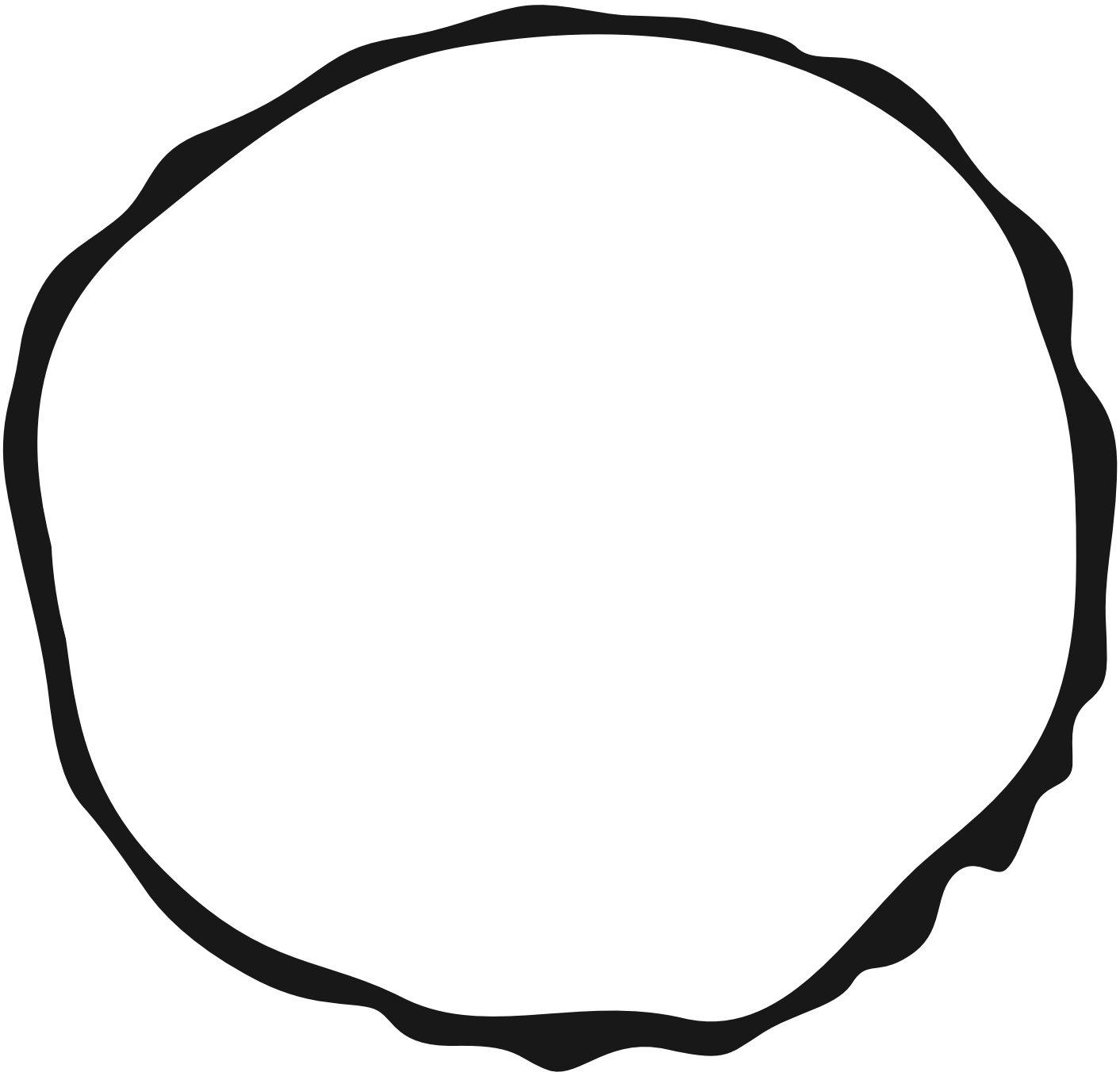
Trees, My Family, and Me



Create

a tree ring diagram and label the tree rings that correspond with dates your family members were born and other important events. For example, was it rainy the year your parents got married? Perhaps there was a thunderstorm on their wedding day. Events such as a forest fire would be significant for both the tree and your family.

Write

a story about an event from the tree's perspective as well as from your own.

Life Lessons from Trees

As we have learned by now, trees store information about their past and teach us about their history and environment, but trees can also teach us a lot about how to live our lives as humans. Trees like **Methuselah**, a bristlecone pine believed to be the oldest living tree, have undergone significant changes over their nearly 5,000-year lifespan.

All trees are *unique*, just like people, and they allow us to appreciate the differences between us. Trees are also *resilient*, which means they survive through tough times just as people can, too. Trees also live in *harmony* with other creatures, which means they co-exist in ways that benefit themselves and the creatures who use them for shelter, food, breeding, and more.

Discussion Questions

1. How do trees like Methuselah help us understand resilience and survival?
2. In what ways are people and trees alike?
3. Why is it important to value differences in trees and in people?
4. What lessons from trees can we apply to our own lives?
5. If you could ask an ancient tree one question, what would it be?

Activity

Look at the examples in the infographic, then research what kind of trees are in your area, and find out more about what makes them special and important. Then, create a poster that shares information about the tree you would like to highlight, and a lesson that people could learn from that tree. Hang up your poster at your school, in your local library, at a community center, or at another location where it is visible to others.

Additional Resources

Crossdating - The Basic Principle of Dendrochronology
This University of Arizona article explains the basics of dendrochronology with examples.

Tree Rings and the Tales They Tell
The National Park Service explains how tree rings serve as nature's record, showing past climates, environmental stresses, and human land-use history by analyzing ring patterns, scars, and overlapping timelines from living trees and historical wood.

Interactive tree ring simulation activity
In this UCAR simulation, grow tree rings in different scenarios to see if your answers are correct.

National Centers for Environmental Information
Browse the world's largest public archive of tree ring data.

Tree & Forest Activities to do with Children
Easy activity ideas from the National Forest Foundation.

Rocky Mountain Tree-Ring Research
Our guest, Dr. Peter Brown's, website is about tree-ring collection, dating, and analysis.

Other Lesson Plans

NOVA Teacher's Tree Ring Dating Lesson Plan
Students will cross-date tree-ring samples to find and determine the age of the oldest one.

Tell the Story of a Tree Lesson Plan
Create a history of the life of a tree and the things it experienced. Supplies needed are paper, pencil, crayons or markers, scissors, and glue or tape.

From Seeds to Giants Lesson Plan
This lesson plan from Braided STEM teaches basic tree growth and tree-ring structure while encouraging learners to observe and draw conclusions about a tree's life.

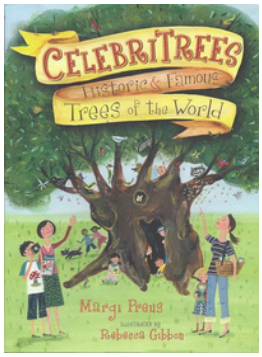
Videos

What is Dendrochronology?
A good introduction and overview.

Research in Action: Tree Ring Analysis in Old-Growth Forests
A hands-on explanation of how tree ring analysis is used to learn about forests and the past and future of the ecosystem.

National Parks in the History of Science: Dendrochronology
Learn about how dendrochronology is used in archeology at the Aztec Ruins National Monument, Chaco Culture National Historical Park, and Mesa Verde National Park.

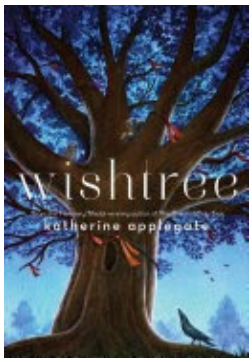
Book List



Celebritrees: Historic and Famous Trees of the World
by Margi Preus, illustrated by Rebecca Gibbon
This book introduces readers to extraordinary real-life trees around the globe and the stories they hold.
ages 7-10

Be a Tree
by Maria Gianferrari, illustrated by Felicita Sala

A poetic picture book that compares the strength and community of trees to people, showing how we all thrive when we stand together.
ages 4-8

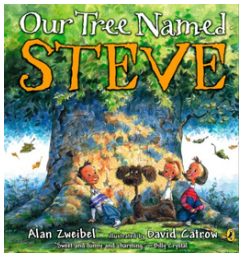


Wishtree
by Katherine Applegate

This middle-grade novel is told from the perspective of an old oak tree named Red. Red becomes a symbol of hope and friendship when a new girl in the neighborhood faces prejudice.
ages 8-12

The Oak Tree
by Julia Donaldson, illustrated by Victoria Sandøy

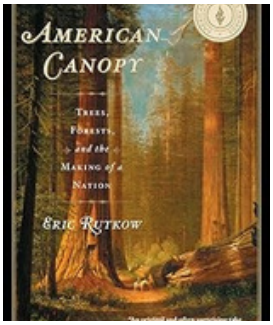
Watch a thousand years in the life of an oak tree—growing from acorn to giant, sheltering people and animals, then falling in a storm as a new acorn begins the cycle again.
ages 3-6



Our Tree Named Steve
by Alan Zweibel, illustrated by David Catrow

A story about a family and their tree, exploring the concept of a "family tree" in a relatable way.
ages 2-6 years

Book List

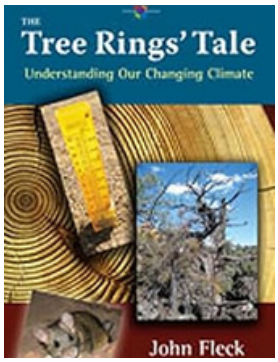


American Canopy: Trees, Forests, and the Making of a Nation
by Eric Rutkow

This engaging work explores the deep and evolving relationship between Americans and their trees throughout the nation's history.
ages 14+

The Tree Book: The Stories, Science, and History of Trees
by DK

This richly illustrated guide explores the science, ecology, history, and cultural significance of trees—from ancient oaks and redwoods to banyans and kapoks—revealing their beauty and importance to our world.
ages 9+

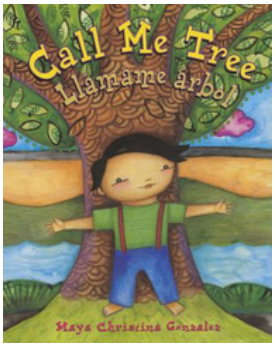


The Tree Rings' Tale: Understanding Our Changing Climate
by Barbara Guth

This book aims to explain tree rings and their role in understanding climate change to a younger audience.
ages 6-8

Call Me Tree/Llamame Arbol
by Maya Christina Gonzalez

This lyrical story follows a child's journey of growth and self-discovery, using trees as a metaphor for belonging, connection, and embracing one's uniqueness in the world.
ages 5-10



I Am Like a Tree series
by Strong Nations Publishing

This four-book series connects Indigenous values to the life and characteristics of trees through stories of courage, belonging, growth, and self-care.
ages 9-13