

Ancient Wise Ancestors:

Linking Ancient Wisdom to Modern Wisdom of the Tree Rings

Instructor material and lesson setup

Arizona Earth and Space Science Standard 8.E1U3.7

Obtain, evaluate, and communicate information about data and historical patterns to predict natural hazards and other geological events.

Diné Content Standard

7th-8th Culture Standard

Concept 1: I will develop an understanding of Diné way of life.

Performance Objective 1: I will engage in activities that will increase my sense of self-worth.

NGSS Performance Expectation

Students will use data from tree cores extracted from Navajo National Monument to determine patterns of drought and wet cycles and use an interactive geographic map to determine approximate ages of ancestral heritage sites.

Instructor Set Up

Materials

Tree cores of Navajo National Monument and modern Ponderosa Pines from the United States Geological Survey (and available below)

Hand lens (magnifying glass)

Ruler (30 cm)

Mobile device with access to the world wide web

Do Now

Provide students with 5 minutes to complete this activity.

- Hint students to look at the support structures of the adobe homes
- For the following questions, ask them to select whether they want to draw a 20-year-old tree cookie or a 30 year-old core.

Once they have completed the activity, discuss student responses without addressing correctness. Some students should notice the wooden beams supporting the adobe homes. Praise students when possible. Observe their drawings of their cookies and cores.

Navajo National Monument – tree cores

Replicas of tree cores are available here: <https://www.ltrr.arizona.edu/instruction/exercise-ptb.pdf>

These cores may be placed into boba/bubble straws.

Distribute materials, including rulers, replicas of tree cores from Navajo National Monument. Provide 5-10 minutes.

Discuss responses about Navajo National Monument. Responses will vary because each core will have different number of rings.

If there is time, students may work together to cross-date the 21 tree cores by looking for similar patterns between the samples.

Collect the cores.

Modern tree cores

Distribute modern cores from the United States Geological Survey:



Credit: USGS.

You may cut these cores and mount them on boba/bubble straws prior to distribution.

Provide each group with one core sample. Assume that these cores were made in 2020.

Modern core

Provide students with 5-10 minutes to complete this task.

Discuss their responses. Each group will have a different answer because of the nature of the different cores.

Collect the cores.

Distribute mobile devices (e.g., i-pads).

Virtual Dendrochronology

Have students visit the Presto Project and load the interactive North American Drought Atlas (NADA): <https://paleopresto.org/visualizer.html?dataset=nada>

The NADA is a map and was created using about 1845 trees, consisting of Ponderosa Pines, Bristlecone Pines, Oaks, Junipers, and Douglas Fir. The NADA is used to estimate soil moisture and climate of the past.

Discuss the color bar prior to students engaging on this part of the activity.



The color bar is there to illustrate the two end members of soil moisture: dry and wet. Students mark an “x” on the color bar of their worksheet based upon the questions and their observations on the interactive map.

Go over the questions. Provide students with 5-10 minutes.
Discuss responses.

Collect the mobile devices.

Understanding from Nature – Traditional Knowledge

In Navajo and Hopi cultures, trees are viewed as sacred beings to be respected. Traditional ecological knowledge values learning from observing nature closely over many years.

Discuss how this activity has impacted students’ cultures. How is knowing about the age of trees relate to where they come from?