TRT: Stephanie Massaro

Original LP in Ed Portal: <http://www.nps.gov/waca/forteachers/classrooms/tree-ring-activity.htm>

**\*\*Park Name**

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| [Walnut Canyon National Monument](http://www.nps.gov/waca/index.htm), [Wupatki National Monument](http://www.nps.gov/wupa/index.htm) |

**\*\*Lesson Plan Title (255 characters maximum)**

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| **Tree Ring Activity** |

**\*\*Essential Question and Quick Lesson Description**

**This should include the lesson’s objective or what question the students should be able to answer at the end of the lesson. This section should also include a quick description of what the students will experience in the lesson. (100 characters maximum)**

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| **Guiding Questions:** What are tree rings? How are tree rings used to determine the age of archaeological sites?**Lesson Objectives:** Students will...* Understand how trees grow and why growth rings are formed.
* Describe how climate and weather affects the growth of tree rings.
* Explain the age of a tree by its rings.
* Understand how ring patterns can be used to determine the age of archaeological sites.
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**\*\*Lesson Grade Level: (Check One of the following)**

\_\_\_ Lower Elementary: Pre-Kindergarten through 2nd Grade

\_X Upper Elementary: 3rd Grade Through Sixth Grade

\_\_\_ Middle School: Sixth Grade Through Eighth Grade

\_\_\_ High School: Ninth Grade through Twelfth Grade

\_\_\_ College Undergraduate Level

\_\_\_ Graduate Level (Masters, PhD)

\_\_\_ Adult Education

**\*\*Lesson Subject: (Check As Many as Apply)**

\_\_\_ Social Studies

\_X\_ Math

\_X\_ Science

\_\_\_ Literacy and Language Arts

\_\_\_ Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Feature Image for Lesson**

**This will be shown next to your lesson on the Education Portal. Provide filename and location below.**

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| http://www.nps.gov/common/uploads/teachers/assets/images/imr/park/waca/D6E6A41D-155D-451F-67BF0512064D514E/D6E6A41D-155D-451F-67BF0512064D514E.jpg |

**Alt Text for Feature Image**

**If the image does not display, what description do you want to appear in its place?**

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| Slice of a tree |

**\*\*Common Core Standards:**

**Want more information about Common Core? Go to <http://www.corestandards.org/>**

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| **Grade Level: 3 Subject Area: ELA** **Common Core Standards:**

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| [**RI.3.1**](http://www.corestandards.org/ELA-Literacy/RI/3) | Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.  |
| [**RI.3.9**](http://www.corestandards.org/ELA-Literacy/RI/3) | Compare and contrast the most important points and key details presented in two texts on the same topic.  |

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| **Grade Level: 4 Subject Area: ELA** **Common Core Standards:**

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| [**RI.4.7**](http://www.corestandards.org/ELA-Literacy/RI/4) | Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. (4-ESS2-2) |

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| **Grade Level: 3-5 Subject Area: Math** **Common Core Standards:** **MP.2: Reason abstractly and quantitatively****MP.4 Model with mathematics** |

**\*\*State Standards:**

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| **State: Arizona Subject: Science Grade Level: 3-5** **State Standards****SS03-S1C1-02: Recognize how archaeological research adds to the understanding of our past.** **SS04-S1C1-04: Describe how archaeological research adds to our understanding of the past.****SC04-S1C4-01: Communicate verbally or in writing the results of an inquiry.** **SC04-S6C2-06: Analyze evidence that indicates life and environmental conditions have changed (e.g., tree rings, fish fossils in desert regions, ice cores).****SS05-S1C1-05: Describe how archaeological research adds to our understanding of the past.****SC05-S1C4-01: Communicate verbally or in writing the results of an inquiry.**  |

**Additional Standards(s) (255 characters maximum): Does this lesson meet additional standards?**

**e.g. Next Generation Science Standards, National Council for Social Studies Standards, Advanced Placement (AP) Courses, International Baccalaureate (IB) Courses, Next Generation Science Standards**

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| Next Generation Science Standards:Students who demonstrate understanding can:

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| **4-ESS2-1.** | Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. [Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow.] [*Assessment Boundary: Assessment is limited to a single form of weathering or erosion.*] |

4-[ESS2.A: Earth Materials and Systems](http://www.nap.edu/openbook.php?record_id=13165&page=179) [Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2-1)](http://www.nap.edu/openbook.php?record_id=13165&page=179)4-[ESS2.E: Biogeology](http://www.nap.edu/openbook.php?record_id=13165&page=189) [Living things affect the physical characteristics of their regions. (4-ESS2-1)](http://www.nap.edu/openbook.php?record_id=13165&page=189)Students who demonstrate understanding can:

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| **3-ESS2-1.** | Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. [Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] [*Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.*] |

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**Thinking Skills (Check As Many as Apply)**

The thinking skills listed below are based on Bloom’s Taxonomy. Consider your lesson procedure and activities. Then check off the thinking skills that students will experience through your lesson.

\_\_X\_ **Knowledge** – Recalling or recognizing information ideas, and principles

\_\_X **Comprehension** – Understand the main idea of material heard, viewed, or read. Interpret or summarize the ideas in own words.

\_\_\_ **Application** – Apply an abstract idea in a concrete situation to solve a problem or relate it to a prior experience.

\_X\_ **Analysis** – Break down a concept or idea into parts and show the relationships among the parts.

\_\_\_ **Creation** – Bring together parts (elements, compounds) of knowledge to form a whole and build relationships for NEW situations.

\_\_\_ **Evaluation** – Make informed judgments about the value of ideas or materials. Use standards and criteria to support opinions and views.

**Complete Lesson File**

**Is there a downloadable file (or PDF) for this lesson plan? If yes, provide filename and location:**

**Be sure your PDF or other file meets universal accessibility requirements, most PDFs do not.**

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| http://www.nps.gov/waca/forteachers/classrooms/loader.cfm?csModule=security/getfile&pageid=752479 |

**Lesson Duration**

 **Time to complete this lesson plan in minutes (25 characters maximum)**

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| 60 minutes |

**\*\*Background Information for Teacher**

**What important content, contextual, or practical information and background knowledge does the teacher need to successfully implement this lesson?**

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**\*\*Important Vocabulary and Terms with Definitions:**

**What terms and academic language will students have to know to participate in the lesson? Lessons typically include 5 to 15 terms and definitions.**

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|  Core, climate, sequence  |

**\*\*Lesson Preparation: What preparation does the teacher need to do before the lesson? What supplies or materials should be gathered?**

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| \*Print copies of lesson pdf for students. Specifically pages 2-7 of the background reading the tree rings\*Print and cut out master copies of tree ring slices for centers\*Each small group needs: scissors, tape, and a large piece of construction or butcher block paper  |

**\*\*Lesson Hook or Preview: What activity, video, song, or other experience could get the students excited about the lesson and thinking about the topic? Is there a way to make the lesson important to their lives or link the lesson content to what they already know?**

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**\*\*Procedure: List the instructions the teacher should follow as Step One, Step Two, Step Three, etc.**

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| Step 1: activate prior knowledge about trees. Which do you think is older a tree with a skinny trunk or a tree with a thick trunk. Why? Make a prediction from the class by taking a poll. Step 2: Complete a guided reading of the background information (pages 2 and 3 of lesson plan packet). Step 3: Now the students will complete an activity where they will do an investigation of what tree is oldest by matching **similar** tree rings. Looking at page 4 of the pdf we can see that Core Sample F and Core Sample D have a ring that matches. Line up the matching rings, make sure they always stay in the same curved direction. Core Sample D, goes further back to the left so D is an older tree. Step 4: In small groups or in partners have the students line up from top to bottom the larger core samples A through F. Students must cut out all six core samples. Arrange them on the paper by aligning matching tree rings. Tape them down AFTER you double check. 10-20 minutesStep 5: Have students do a “gallery walk” around the room. Rotate around the room seeing if other groups or pairs have the same alignment/timeline. Have students share out any observations.Step 6: Have students complete the **Tree Ring Activity Questions** worksheet with their small group. Step 7: At the end, have students review correct answers by mixing groups or have students pair with a NEW partner.  |

**\*\*Assessment: How can teachers tell that each individual student has met the objective? How will teachers see if each student knows the answer to the essential questions or has mastered the skills? Below, include below a brief description of how to use the assessment. Later in this template you are provided with the opportunity to upload a digital copy of the assessment for teachers to print and use.**

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**Lesson Materials: Any worksheets, photos, primary source, scientific data, maps, graphic organizers, or PowerPoint ‘s should be described and attached using the template below. Please create additional materials boxes if necessary.**

**Material #1**

**Title (255 characters maximum):**

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| Tree Ring Background Reading |

**Summary (how does the material function in the lesson?):**

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**Downloadable file of this material in original format if possible, such as Microsoft word or PowerPoint (Provide filename and location)**

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| http://www.nps.gov/waca/forteachers/classrooms/loader.cfm?csModule=security/getfile&pageID=752482 |

**Material #2**

**Title (255 characters maximum):**

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| Tree Core Sequences  |

**Summary (how does the material function in the lesson?):**

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**Downloadable file of this material in original format if possible, such as Microsoft word or PowerPoint (Provide filename and location)**

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| http://www.nps.gov/waca/forteachers/classrooms/loader.cfm?csModule=security/getfile&pageID=752484 |

**Material #3**

**Title (255 characters maximum):**

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| Tree Core Sequence Examples |

**Summary (how does the material function in the lesson?):**

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**Downloadable file of this material in original format if possible, such as Microsoft word or PowerPoint (Provide filename and location)**

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| http://www.nps.gov/waca/forteachers/classrooms/loader.cfm?csModule=security/getfile&pageID=752488 |

**Material #4**

**Title (255 characters maximum):**

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| Worksheet Questions for Students |

**Summary (how does the material function in the lesson?):**

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**Downloadable file of this material in original format if possible, such as Microsoft word or PowerPoint (Provide filename and location)**

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| http://www.nps.gov/waca/forteachers/classrooms/loader.cfm?csModule=security/getfile&pageID=752486 |

**Material #5**

**Title (255 characters maximum):**

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| Tree Ring Answer Key |

**Summary (how does the material function in the lesson?):**

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**Downloadable file of this material in original format if possible, such as Microsoft word or PowerPoint (Provide filename and location)**

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| http://www.nps.gov/waca/forteachers/classrooms/loader.cfm?csModule=security/getfile&pageID=754103 |

**Assessment Materials**

**How can teachers tell that each individual student has met the objective? How will teachers see if each student knows the answer to the essential questions or has mastered the skills? Attach below the assessment and, if applicable, a rubric or answer key.**

**Assessment**

**Title (255 characters maximum):**

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**Summary (how does the material function in the lesson?):**

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**Downloadable file of this material in original format if possible, such as Microsoft word or PowerPoint (Provide filename and location)**

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**Assessment Rubric or Answer Key**

**Title (255 characters maximum):**

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**Summary (how does the material function in the lesson?):**

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**Downloadable file of this material in original format if possible, such as Microsoft word or PowerPoint (Provide filename and location)**

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**Supports for Struggling Learners**

**If a learner is struggling to understand the objective, essential question, or skills presented in the lesson, what can be done to help this learner? Is there a lower reading level version of text? Is there a more image heavy or simplified version of content? Can supportive devices be provided such as calculators?**

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| Assist students by pre-cutting out their tree core sequences and have them work only on the alignment/matching.  |

**Extensions for Excelling Learners**

**If a learner is really excelling at the objective and skills presented in the lesson, what can be done to continue to challenge this learner? Can the student create a product or learn more in depth about the content?**

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**Additional Resources**

**Please list websites, references, or other materials for further research by interested students that is not already provided within the lesson.**

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**Related Lessons or Educational Materials**

**Is this lesson connected to other lessons within a unit? Is this lesson related to a field trip guide or activity? If so, list the website address or titled of these other materials below.**

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