Back in Time:

Investigating the history of a forest

Purpose:

- Tree rings tell a story about the history of a tree including the good times and the bad. Students will examine tree cookies to investigate these historical events.

Objectives:

Students will:

- Observe tree rings in a tree cookie of a conifer and explain the meaning of the light and dark portions of a tree ring.
- Determine the age of the tree by counting the tree rings.
- Measure the width of the tree rings and graph the results.
- Explain how the width of tree rings relates to a tree's growth.
- Describe three factors that affect the growth of a tree including factors such as drought, crowding (competition), fire, disease, damage, and insect damage.
- Reconstruct the history of the tree using the graph as a tool.

Time Required: 1.5 hours
Appropriate Grade Level: 4-6
NGSS Standards:
3-LS3-2: Use evidence to support the explanation that traits can be influenced by the environment.
3-ESS2-1: Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.
MS-ESS3-2: Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects**.**

Materials:

- **Back in Time: Background Info** (one copy in binder)
- **5 Large Tree Cookies**
- **Back in Time: Procedure** Worksheet (in binder, one copy for each student)
- **Back in Time: Results** worksheet (in binder, one copy for each student)
- **Back in Time: Questions** worksheet (in binder, one copy for each student)

Not provided in this kit:

- Rulers

Activity:

Introduction	Go outside and play "Meet a Tree" from Joseph Cornell's *Sharing Nature*. Head outside, avoiding areas with poison oak. Have students pair up. One student is the blindfolded *player* and the other student acts as the *guide*. The guide leads their blindfolded player to a tree. Upon meeting the tree, the blindfolded player feels the texture of the tree's bark, leaves, sees how big the tree is by hugging it, etc. The guide may help the player locate interesting parts on the tree. Have the guide lead the player back to the starting place. Then the player must walk around looking for their tree. Switch roles. Come back together as a group and have students think-pair-share some interesting features they felt on their tree. Have them think about why these features are on the tree. Do these features help us understand the tree? Close the introduction by telling the students that "every tree has a story."
Body	Divide class up into 5 groups so that each group has one **Large tree cookie** to examine. Provide each student a copy of: **Back in Time: Procedure Worksheet** **Back in Time: Results Worksheet** **Back in Time: Questions Worksheet** Provide each group with 1 or 2 **rulers**. In this activity you will be examining a "tree cookie." A tree cookie is a slice from the trunk of a tree. Notice the difference between the texture and color of the bark and wood. Take a closer look at the wood and examine the tree rings. Each ring represents one year in the life of the tree. Some rings will be wider than others. Wide rings tell us that the tree grew a lot that year. A narrow ring may tell of a drought or other poor growing conditions. The oldest rings are located at the center of the tree. They become younger as you move out towards the bark. A new ring is added each year just under the bark by a thin layer of cells called cambium. Have the groups go through their **Procedure and Results worksheets**. Assist students with measuring and graphing if necessary. Have the students go through the **Back in Time: Questions Worksheet** on their own, in pairs, or as a group. Discuss the answers to the questions as a class.
Closure	Conclude by having the students think-pair share. Prompt them with questions such as: Are trees able to tell us their life stories? If so, how? Are trees able to respond to environmental factors? If so, how?

	What are some signs trees leave behind that help us know more about the tree and the environment?

Modifications/Extensions:

- Middle School and High School:
  - Imagine you were this tree with its different growth rates and maybe scars. Beginning with the seed that drifted down from a cone growing on a tree some distance away, create a story of its life as it is reflected in the wood cookie. (None of the trees from which these wood cookies were made were cut down. They fell in a winter storm.)
  - The activity involving wood cookies can be presented in a different format as a science inquiry activity.
    - Once students understand the meaning of tree rings and where new growth rings are formed, the students can be asked to pose some question about the growth of a tree. For example, a student might ask "When in the life of a tree does it grow the fastest?" or "Do trees grow at the same rate each year?" or "Can fire or drought be identified by examining tree rings?"
    - At this point students will need to form a hypothesis (an untested explanation that attempts to answer their question). Upon examining a wood cookie, they will then design a procedure for collecting data from a wood cookie that will assist them in answering their question. Measuring the width of tree rings in some meaningful way should allow them to construct a graph from which they can evaluate their hypothesis.