

# Tree Twig Growth Rate

## 1 EXTENSION



### Section 1 FOREST ACTIVITIES

**Grade Level:** 7 - 12

**State Standards:** S A-15, SB-1, SB-5  
**NGSS:** MS-LS1-5 MS-LS2-1.

**Subjects:** Science, math

**Skills:** Observing, comparing, analyzing, mapping, graphing

**Duration:** 30-60 minutes

**Group Size:** Whole class

**Setting:** Indoors or outdoors

**Vocabulary:** Dormant, terminal bud

### Objectives:

1. Students will determine the growth rate of a tree based on the number of terminal bud scars.
2. Students will infer environmental conditions based on varying lengths of annual growth as depicted by terminal bud scars.

### Teaching Strategy:

Students will identify terminal bud scars on a deciduous tree or bush by locating closely spaced, fine lines encircling twigwood.

### Complementary Activities:

*OUTDOOR:* “Tree Identification” and “Tree Trucks” in this section, and “Forests and Sunlight” in Section 4, *Succession*. *INDOOR:* “Build a Tasty Tree” and “Tree History – Your History” in this section.

### Materials:

If the activity is conducted outside, students can use live specimens. If in the classroom, samples of twigwood must be collected. Magnifying lenses, measurement devices, and record sheets.

### Background:

See **INSIGHTS**, *Section 1, Elements that Create Forests*.

### Procedure:

1. Explain to students that many trees produce buds at the end of the summer growing season. These buds remain **dormant** during the winter until warmer weather causes the buds to open in the spring.

The location of a **terminal bud** on the twig creates a discoloration on the tree bark and leaves a scar of several closely spaced, fine lines that encircle the twig. Each terminal bud scar marks the end of a year’s growth.

2. Students will examine twigwood, beginning at the end of the branch and moving back toward the trunk, noting each bud scar to determine the growth rate of that twig. *As the twigwood becomes a branch, the thicker bark obscures the end of a year’s growth.*

3. Students will use measurement devices to determine growth patterns as indicated by the spacing of the bud scars. *These growth patterns reflect varying environmental conditions that influenced the growth of the tree through time.*



*For example, a growth spurt would be indicative of favorable environmental conditions.*

4. If students are conducting this experiment on live specimens, they can compare growth pattern on twigs at different locations on the same tree to determine if environmental conditions, such as greater amount of sun on one side of a tree, affect the twig growth on a single tree.

### **Evaluation:**

Beginning with the most recent terminal bud scar, students will date a twigwood specimen.

### **EXTENSION:**

**Map trees studied and graph results.** If the activity is conducted outside on live specimens, students will map the location of the trees studied. Working backward from the most recent terminal bud scar, students will graph the rate of growth for each of the twigwoods examined. Students will then examine their data to determine if, within their sample area, environmental fluctuations occurred that affected the annual growth of the trees.

### **Credits:**

Adapted by Jeanne L. Williams, teacher at Kingikmiut School, Wales, Alaska, from *Botany for All Ages – Discover-*

*ing Nature Through Activities Using Plants*, Jorie Hunken and the New England Wild Flower Society, The Globe Pequot Press, Chester, CT, 1989.

### **Curriculum Connections:**

(See appendix for full citations)

### **Books:**

*Science Project Ideas About Trees* (Gardner)

*Focus on Trees* (Ganeri)

*Tree (Eyewitness Book)* (Burnie)

*Trees (Eyewitness Explorer)* (Gamlin)

### **Teacher Resources:**

(See appendix)

