

Tree Climbing Educational Programs

Purpose: Recreational tree climbing is a great way to get learners outside in nature and engaged in active learning. The challenge and perceived risk of climbing fosters adventure learning that promotes communication, cooperation and self confidence. Participants learn specific skills required to climb safely and effectively. And the elevated environment in a tree is a unique laboratory with rich learning opportunities. This document outlines learning programs based on tree climbing and presents some lesson synopses.

Tree Climbing Foundation: In an introductory tree climbing program, participants climb a rope to a limb or branch. Training and gear is provided and participants can begin climbing within 10 minutes of program start. An introductory tree climb is a great learning experience in itself, and provides the foundation for using the tree as a laboratory. Tree climbs must be conducted by a qualified facilitator.

Beyond an introductory tree climb, programs may be designed that include a belayed free climb, rappelling from the tree, a bridge or traverse to another tree, a multi-pitch climb, and a variety of other elements that add challenge, involvement, and fun with resultant experiential learning and greater opportunities for content lessons.

The Tree as a Laboratory: A tree is outside, tall and strong so it may be climbed to considerable height; a tree is a living organism and a host for other living organisms. These are great attributes for a learning environment.

Lessons may be directly related to trees and the natural world (e.g., tree biology, organisms and their environments, life cycles, photosynthesis), may utilize the height and structure of a tree (e.g., force and motion, simple machines, gravity), or may take advantage of trees as places of solace and reflection (e.g., literature, journaling, art).

Quantitative experiments: Measure a quantity in the tree. Pose a hypothesis about what the data will show. Analyze the data (e.g., with a graph), draw conclusions from the analysis and compare to the hypothesis.



Tree stem taper: Measure trunk circumference at various heights. Graph by height to analyze. The data will show a taper, which may be compared to an idealized model. Open grown and forest trees have different profiles. Different species have different profiles. Also, the data is likely to show steps after branches.

Temperature: Measure by height – there is likely to be no significant change. The hypothesis must include a lapse rate by elevation, for which a tree is too short. Measure temperature away from the tree, under the tree, at various points along the trunk and in the canopy. This is a good lesson in experiment design and drawing conclusions.

Lichen / moss colonies: Measure or estimate the size of colonies (area, thickness, volume) as compared to height in the tree. Lower parts of the tree host larger colonies because of available surface area and shade. Observe / identify various species.

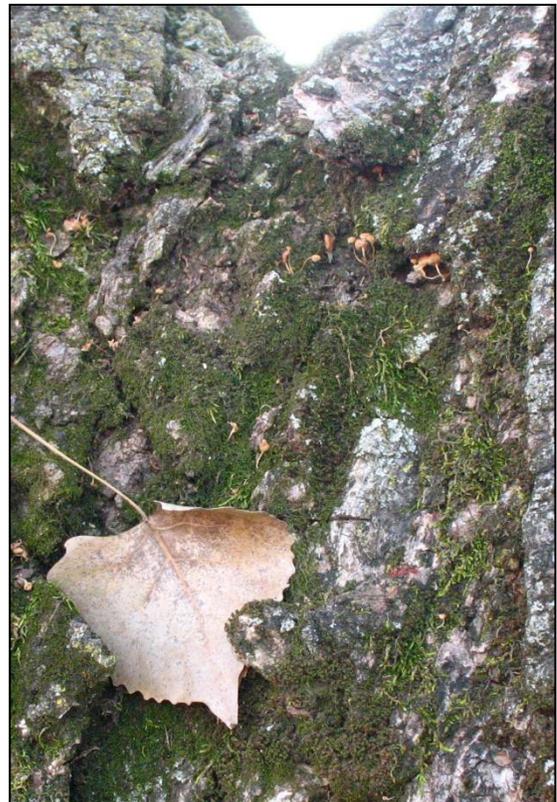
Drop objects: Measure time required to reach the ground from various heights. Measure the impulse when object reaches the ground with objects of various weights (e.g., measure by indentation in a malleable material such as styrofoam). Analyze using principles of physics. A variety of fun and compelling experiments in force and motion are possible in trees.

Simple machines: Use ropes / pulleys / levers to create 1:1, 2:1, 3:1, etc. mechanical advantage systems. Test using counterweights or spring scales. Exercise the systems to hoist large weights with little force / large motions. Measure forces required and compute friction losses. Create systems that act at angles. Compute vector components of force.

Qualitative Lessons: Make and record observations about the tree and areas in and around the tree. Look for things that are expected or unexpected, form a pattern, seem to affect or be affected by other things, are subject to change with time or conditions, and are interesting for other reasons. What is the goal of the observations? What is the research question? Should a research question be defined before or after commencing observations? How will observations be recorded (notes, drawings, audio, photos, video, etc.)?

Other living things in the tree: Are there other living things (e.g., lichen, moss, vines, epiphytes, fungus)? What are they? Where / how are they distributed? Any evidence of living things that are not currently present (e.g., nests, den holes, stools, food remnants)? Where are these items and what do they indicate?

The tree: How tall / broad is it? Does it have many / few branches? Do branches start low / high on the trunk? Do branches emerge at right angles or acute angles to the trunk? Is there large / small leaf volume? Leaf size small / large in different places on the tree? Many / few dead branches? Any wounds or defects on the tree? Is the crown symmetrical / asymmetrical? How do these observations compare to other trees?



Observe the tree (1) from the ground and (2) from the tree: What can you see from the ground? What do you expect to observe once in the tree? What questions are raised that you expect to answer from observations in the tree? What did you discover after you climbed the tree?

Observe the ground (1) from the ground and (2) from the tree: Apply the same questions as above.

Reflective Exercises: Climbing and spending time in a tree is a unique opportunity for participants to connect with themselves, others and the natural world. The arboreal environment promotes feelings of well being and helps participants achieve peaceful reflection and interaction.

Quiet time: Sit quietly and experience the environment in the tree. Listen for natural sounds, man-made sounds. Feel sensations on the skin – air movement, temperature, sunlight. Feel the tree under the fingers, through clothing or shoes. Detect smells in the air. How does this compare to sitting elsewhere (at home, in a car, on a park bench)? How does it make you feel? What are other ways to achieve similar quiet time?

Breathe like a tree: After learning about photosynthesis and the exchange of Carbon Dioxide for Oxygen, take long deep breaths as you imagine a tree might take. Imagine the uptake of CO₂ and emission of O₂ and visualize the benefits to organisms.

Reading in a tree: Read poems / stories / articles while sitting in a tree. These may be selected from outside works or created by the students themselves. Topics may be about trees, the natural world, human affairs, or other topics of interest.

Writing in a tree: Write in a journal while sitting in the tree. Record responses / thoughts to a reading in the tree, or to the experience of climbing into the tree. Spend some time in quiet reflection and then record thoughts / feelings. Spend time creating or outlining a writing assignment.



Lessons that utilize tree climbing may be combined with other outdoor and adventure experiences to create compelling learning opportunities. This document presents ideas and lesson outlines as starting points. Please contact Adventure Tree for more information about tree climbing and adventure education.