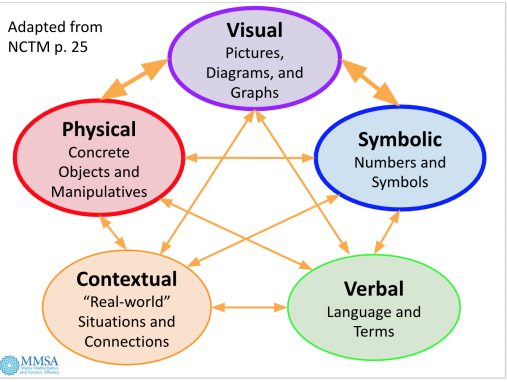




Numeracy in Nature Instructional Guide

Grade level	Grade 3-4 (adaptations for K-2, 5)
Duration of lesson	45-60 minutes depending on the length of the walk to the trees
Math Concept(s)	Measurement & Data
Learning Targets and/or Standards	Measurement & Data: Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch.
Standards for Mathematical Practice in which learners will be engaged.	<ul style="list-style-type: none"> • Make sense of problems and persevere in solving them. • Reason abstractly and quantitatively. • Model with mathematics. • Use appropriate tools strategically. • Attend to precision.
Mathematical Representations	<ul style="list-style-type: none"> • Visual • Physical • Contextual • Symbolic • Verbal <div style="text-align: center;"> <p>Adapted from NCTM p. 25</p>  <p>The diagram illustrates the interconnected nature of mathematical representations. It features five colored ovals arranged in a circle, each representing a different mode of representation. Double-headed arrows connect every pair of ovals, forming a complete graph that signifies how these representations are not isolated but are deeply interrelated and can be used to translate between one another.</p> </div>
Drivers of Instruction	<ul style="list-style-type: none"> • Making Sense of the World (Understand and Explain)
Materials and alternatives	<ul style="list-style-type: none"> • Rope or Measuring Tapes • Measuring Tools (yardsticks)

	<ul style="list-style-type: none"> • Clipboards (or whiteboards) • Paper and Pencil (or markers)
Lesson Activities	Slide Deck Show animation, Tree Growing (Notice and Wonder)
Talk moves/Purposeful Questions	<ul style="list-style-type: none"> • Why would we want to estimate a tree's age by measuring versus counting the rings? • We have meter sticks and rope. How can we measure the circumference? • Why do you think we need to measure the girth of the tree at the height of 4.5 feet?
Formative Assessment Strategies	<p>During:</p> <ul style="list-style-type: none"> • Observe how students are measuring. • Listen to conversations: Are students able to make the tables to make reasonable estimates? • Are there any tangles/errors to address as a full group? <p>After:</p> <ul style="list-style-type: none"> • How does each student do on the independent exit ticket? [Give a circumference, ask for the age, Give an Age, ask for the circumference]
Adaptations	<ul style="list-style-type: none"> • Grade 5-6: have students solve for the age using the growth factor (no age tables). • K-2 Find a tree the age of ____ (ie arm span, span of a number of hands) <ul style="list-style-type: none"> ◦ Can prepare over the course of a few days by cutting rope the length of student;s arm span or the length of a number of hand spans. <div style="display: flex; justify-content: center; gap: 20px;">   </div> <p>https://cdn.naturalresources.wales/media/688308/activities-tree-measuring.pdf</p>

Opportunities for interdisciplinary connections	<ul style="list-style-type: none"> • Science •
Lesson Creators	<p>MMSA, adapted from NCTM</p> <p>Activity Adapted from Tree Talk, NCTM Illuminations https://www.nctm.org/Classroom-Resources/Illuminations/Lessons/Tree-Talk/ Maine Tree Data gathered from https://www.maine.gov/dacf/mfs/publications/handbooks_guides/forest_trees/individual_spp_index.html</p>