



Wood Pacing Guide¹

Use the information below to assist you in determining the amount of time needed to complete the entire unit. These recommendations assume the **average science class period is 30 to 45 minutes in length**. We recommend teaching science a minimum of three sessions per week in order to maintain consistency and keep students engaged. Many teachers accomplish this by rotating a science unit with a social studies unit, enabling you to teach more science sessions in one week and finish the unit in fewer weeks. We highly recommend that all teachers participate in the Expository Writing and Science Notebooks Program in order to further develop students' science understandings, as well as their scientific thinking and writing skills. To implement the science-writing curriculum requires, for most lessons, a separate 20 to 30 minutes for a science-writing mini-lesson and independent writing time. Time for these mini-lessons is not included in this pacing guide.

Lesson and Common Assessments (see corresponding pages in the Instructional Guide for lesson planning)	Recommended Number of Periods	GLEs Addressed/Big Idea(s) of the Lesson	Considerations for Planning	Recommended Applications and Extensions
<p>Activity 1.1: Introduction to Wood Samples</p> <p>Students observe the five wood samples using their senses and discuss their properties.</p>	1	<p>GLE 1.1.1 Understand simple properties of common natural and manufactured materials.</p> <ul style="list-style-type: none"> • <i>Identify and describe the properties of an object [wood].</i> <p>Big Idea: There are different types of wood with properties that are alike and different.</p>	<p>Before beginning the unit, teach the students about the five senses. You might want to read <u>My Five Senses</u> by Aliki.</p> <p>Modifications:</p> <ul style="list-style-type: none"> • Redwood has been replaced with Western Red Cedar because it is native to Washington. • Do not show pictures of how particleboard and plywood are made. Wait to show these until after the students experience the process of making wood. 	<ul style="list-style-type: none"> • At the end of each lesson, review the focus question and write a summary statement about what was learned. At the end of the unit, these can be compiled into a class book. • Show pictures of the cedar, pine, and linden (basswood) trees instead of the black and white drawings provided in the manual. • Have the wood samples and hand lenses available as a center activity.
<p>Activity 1.2: Wood Hunt</p> <p>Students match pieces of wood that are “hidden” in the room based on their properties. They also compare two types of wood.</p>	1	<p>GLE 1.1.1 Understand simple properties of common natural and manufactured materials</p> <ul style="list-style-type: none"> • <i>Sort common material using a single property [matching].</i> <p>Big Idea: There are different types of wood with properties that are alike and different.</p>		<ul style="list-style-type: none"> • Use the “This is made of wood.” labels and label things in the room that are made of wood. Discuss the properties of the wood they have identified and why wood is a good material for making things. • Give each student a few extra labels so they can label things at home. • Create another box and t-chart comparing two more wood samples.

¹ Pacing Guide for use with the *WOOD* Teacher’s Manual, The Regents of the University of California (1995)

<p>Activity 1.3: Wood and Water</p> <p>Students observe what happens to drops of water when you put them on different types of wood.</p>	<p>1</p>	<p>GLE 1.1.1 Understand simple properties of common natural and manufactured materials 2.2.2 Understand that observations are used by scientists to describe the natural world. <ul style="list-style-type: none"> • <i>Raise questions and seek answers by making careful observations and trying things out.</i> 3.2.2 Know that people have invented tools for everyday life [magnifying glass]. Big Idea: Different woods have properties that cause them to interact with water in different ways.</p>	<ul style="list-style-type: none"> • Modification: Have students practice using the pipette and have students observe what happens when they drop water on a paper towel and wax paper. If students have already done the Fabric unit, the modification can be skipped. • Skip #7 on page 9 (Does wood float/sink?). This will be covered in lesson 1.4. 	
<p>Activity 1.4: Sink the Pine and Plywood</p> <p>Students test the wood samples to see whether they will sink or float. They then try out their ideas for making the wood sink.</p>	<p>1</p>	<p>GLE 2.2.1 Understand that all scientific observations are reported fairly. <ul style="list-style-type: none"> • <i>Record what was observed and explain how it was done accurately and honestly.</i> • <i>Keep records that have not been changed even if they did not match initial expectations.</i> 2.2.2 Understand that observations are used by scientists to describe the world. Big Idea: Different woods have properties that cause them to interact with water in different ways.</p>	<ul style="list-style-type: none"> • Modification: Asses prior knowledge about floating and sinking. If students have limited knowledge of floating and sinking, use the modification in the packet. • Do not show the rubber bands and paper clips. Ask for ideas about how they could make the wood sink. Try out as many of their ideas as possible. Bring out the materials after students have tried their own ideas. • This lesson is open exploration. Be sure to give students time to explore without much teacher guidance. 	<p>Chart students' questions about wood and, if possible, investigate some of their ideas.</p>
<p>Activity 1.5: Sinking Investigation</p> <p>Students plan and conduct a fair test to investigate how many paper clips it takes to sink the cedar and particleboard.</p>	<p>1</p>	<p>GLE 2.1.1 Understand how to ask a question about objects, organisms, and events in the environment. 2.1.2 Understand how to plan and conduct simple investigations. [fair test] 2.1.3 Understand how to construct a reasonable explanation using evidence. 2.1.5 Understand how to record and report investigations, results, and explanations. [drawings]. Big Idea: Different woods have properties that cause them to interact with water in different ways.</p>	<p>Modification: Do not tell the students the procedure for determining how many clips it takes to sink the wood. Instead guide students in developing their own procedures.</p>	<ul style="list-style-type: none"> • Continue the investigation by testing pine, plywood, and basswood. • Review the list of students' questions and ask where they might find answers to these questions.

<p>Activity 2.1: Sanding Wood</p> <p>Students sand the basswood and observe the physical changes.</p>	1	<p>GLE 1.2.3 Know that common materials are made of smaller parts.</p> <ul style="list-style-type: none"> • <i>Show that people use magnifiers to observe things they cannot see with their eyes.</i> <p>2.1.3 Understand how to construct a reasonable explanation using evidence.</p> <p>2.1.5 Understand how to record and report investigations, results, and explanations. [drawings]</p> <p>3.2.2 Know that people have invented tools for everyday life. [magnifying glass/hand lens]</p> <p>Big Idea: Wood can be physically changed (e.g. sanding it into smaller pieces) and when it is changed, it may have different properties (e.g., sanding creates sawdust).</p>	<p>Tip: Have students use the hand lenses to carefully observe what is on the plate. They should be able to see the sawdust and the sand from the sandpaper clearly.</p>	<ul style="list-style-type: none"> • Students can investigate what happens when they try other grades of sandpaper. They can also sand different types of wood. • Bring in a saw and have students observe what happens when you saw a notch in a 2x4. • Make sandpaper. Put glue on a 3x5 card and sprinkle sand over it. Shake off the excess.
<p>Activity 2.2: Sawdust and Shavings</p> <p>Students observe sawdust and shavings and investigate what happens when they are mixed with water.</p>	1	<p>GLE 1.2.3 Know that common materials are made of smaller parts.</p> <p>Big Idea: Wood can be physically changed (e.g. sanding it into smaller pieces) and when it is changed, it may have different properties (e.g. sanding creates sawdust).</p>	<p>Tip: The sawdust and shavings need 2-3 days to dry before using in the next lesson (2.3).</p>	<p>Continue to add questions to the <i>I wonder</i> chart.</p>
<p>Activity 2.3: Making Particleboard</p> <p>Students make particleboard by mixing sawdust and shavings with a cornstarch matrix.</p>	1	<p>GLE 1.2.1 Understand that things are made of parts that go together.</p> <ul style="list-style-type: none"> • <i>Identify the parts of objects and materials [sawdust and glue in particleboard].</i> <p>1.2.3 Know that common materials are made of smaller parts.</p> <p>Big Idea: Some wood products are manufactured from smaller wood materials (e.g. through laminating or gluing or mixing smaller wood particles with glue).</p>	<p>Don't show the poster about how particleboard is made until after the students have had a chance to make their own.</p>	<p>Compare the procedure the students used for making particleboard with the procedure on the poster.</p>
<p>Activity 2.4: Making Plywood</p> <p>Students make plywood by gluing together thin pieces of wood.</p>	1	<p>GLE 1.2.1 Understand that things are made of parts that go together.</p> <p>1.2.3 Know that common materials are made of smaller parts.</p> <p>Big Idea: Some wood products are manufactured from smaller wood materials (e.g. through laminating or gluing or mixing smaller wood particles with glue).</p>	<p>Don't show the poster about how plywood is made until after the students have had a chance to make their own.</p>	<ul style="list-style-type: none"> • Make a box and t-chart comparing student plywood with the plywood samples. The website home.howstuffworks.com/question154.htm has information on how plywood is made. • Compare the procedure the students used for making plywood with the procedure on the poster.
<p>Activity 2.5: Nailing</p> <p>Students use hammers to put nails into pieces of wood.</p>	1	<p>GLE: 3.2.2 Know that people have invented tools for everyday life.</p> <ul style="list-style-type: none"> • <i>Describe ways in which common tools help people in everyday life. [magnifying glass, hammer]</i> <p>Big Idea: Wood can be transformed into useful and/or artistic products by using woodworking tools and skills such as nailing, staining, and gluing.</p>	<ul style="list-style-type: none"> • This activity is best done as a center because there only 4 hammers come in the kit. It is helpful to have another adult in the room. • Cedar is best for nailing because it is soft. Do not use the plywood. 	<ul style="list-style-type: none"> • Students can try nailing two pieces of wood together. • Bring in a variety of nails and discuss what they might be used for. • Go on a hunt to find wood items that were made using nails.

<p>Activity 2.6: Staining</p> <p>Students stain wood and observe how it changes in appearance.</p>	1	<p>GLE 1.1.1 Understand simple properties of common natural and manufactured materials and objects. Big Idea: Wood can be transformed into useful and/or artistic products by using woodworking tools and skills such as nailing, staining, and gluing.</p>	<p>Tip: Save a piece of stained wood to use in the wood sculpture (lesson 2.7).</p>	<ul style="list-style-type: none"> • Go on a hunt to find wood items that have been stained or painted. • As a homework project, students can write or draw about items at home that have been stained or painted.
<p>Activity 3.1: Introduction to Paper Samples</p> <p>Students observe the paper samples using their senses and describe their properties.</p>	1	<p>GLE 1.1.1 Understand simple properties of common natural and manufactured materials. Big Idea: There are different types of paper with properties that are alike and different.</p>	<ul style="list-style-type: none"> • This lesson has been added to give students another opportunity to make careful observations about properties, develop vocabulary, and practice making comparisons. • Teachers need to provide 4x4 inch samples of as many of the following kinds of paper as possible: construction, Kraft, newsprint, paper towel, tagboard, and tissue. Try to use white or brown paper. 	<p>Make a box and t-chart comparing two types of paper.</p>
<p>Activity 3.2: Writing and Drawing on Paper</p> <p><u>Session 1:</u> Students plan and conduct a fair test to investigate which paper is best for writing with a pencil. <u>Session 2:</u> Students conduct the same fair test to investigate which paper is best for writing with a crayon and marker.</p>	2	<p>GLE 1.1.1 Understand simple properties of common natural and manufactured materials. 2.1.2 Understand how to plan and conduct a simple investigation. 2.1.3 Understand how to construct a reasonable explanation using evidence. 2.1.5 Understand how to record and report investigation, results, and explanations. <ul style="list-style-type: none"> • <i>Report observations of simple investigations using drawings and sentences.</i> Big Idea: Different papers have properties that cause them to interact with writing tools in different ways.</p>	<p>This lesson has been added to give students another opportunity to design and conduct a fair test. Use the following papers for this lesson: tagboard, paper towel, corrugated paper, newsprint, waxed paper, and tissue. Each student will also need a pencil for session 1 and a black crayon and marker for session 2.</p>	<p>Have students think of questions they have about paper (use the prompt <i>I wonder</i>). If possible investigate some of their ideas.</p>
<p>Activity 3.3: Folding Paper</p> <p>Students fold paper to find out which ones are good for folding.</p>	1	<p>GLE 1.1.1 Understand simple properties of common natural and manufactured materials. 2.2.2 Understand that observations are used by scientists to describe the world. 3.2.2 Know that people have invented tools for everyday life. [magnifying glass] Big Idea: Different papers have properties that cause them to interact in different ways.</p>	<p>This lesson has been added to give students another opportunity to make careful observations about properties, develop vocabulary, and practice making comparisons. Use the following samples: newsprint, chipboard, construction, corrugated cardboard, Kraft, and waxed paper.</p>	<ul style="list-style-type: none"> • Add questions to the <i>I wonder</i> chart. • Show students an origami book and do a simple origami project. • Take apart a paper box and observe how it was made. See how many boxes are made out of one large folded piece of paper.
<p>Activity 2.7: Wood Sculpture (optional)</p> <p>Students join pieces of wood together to make a sculpture.</p>	1	<p>GLE None addressed in this optional lesson. Big Idea: Wood can be transformed into useful and/or artistic products by using woodworking tools and skills such as nailing, staining, and gluing.</p>	<p>This lesson does not include science content. It is an art extension and can be used as a final project to bring closure to the unit. Because there is no new science content, this lesson is optional.</p>	<p>Read from <u>Wood and Paper</u> (Science Stories, Foss) “The Story of a Chair”. This story tells about starting from a tree and going through the process where the woodworker makes a chair from wood.</p>