



## Physical Properties of Wood

*This is a hands-on lesson in which students investigate the relationship between physical properties of wood and its suitability for construction purposes. Students will investigate the density, stiffness, and elasticity of several species of wood.*

### ***Primary Learning Outcomes***

How do the physical properties of matter affect our everyday lives?

### ***Additional Learning Outcomes***

How is density calculated?

### ***Assessed Georgia Performance Standards***

***SCSh3.*** Students will identify and investigate problems scientifically.

- a. Suggest reasonable hypotheses for identified problems.
- b. Develop procedures for solving scientific problems.
- c. Collect, organize, and record appropriate data.

***SCSh4.*** Students will use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.

- a. Develop and use systematic procedures for recording and organizing information.
- b. Use technology to produce tables and graphs.
- c. Use technology to develop, test, and revise experimental or mathematical models.

### ***Procedures/Activities***

*Step: 1 Duration: 10 minutes*

Review with students the concept of density and how it is calculated.

*Step: 2 Duration: 30 minutes*

Talk with students about the properties of wood that make it suitable for use as a construction material. Include in the discussion density, moisture content, elasticity, and nail-holding capacity.

*Step: 3 Duration: 30 minutes*

Students are then broken into 4 lab groups that will investigate the bending strength of one of the four species of wood. Students will be given a strip of wood (1" x 2" x 48"), two clamps, and a set of weights and will be given the opportunity to formulate the method by which they investigate the relationship between density and bending strength. First, the students should measure the density of their piece of wood. The students will come up with a method by which they can measure the bending strength of the piece of wood. They should come up with some sort of method in which they suspend a piece of wood between two tables securing the strip of wood to each table with a clamp. After the wood is suspended, the students will then add weight

to the center of the piece of wood until it breaks. At this point, the students will compare their bending strength and density with that found by other groups to formulate the relationship between bending strength and density.

*Step: 4 Duration: 20 minutes*

Students will compare their information with that from other groups and will then draw conclusions concerning the relationship between density and bending strength. Students should compile their information in a data table for comparison.

***Materials and Equipment***

1. 3/4" x 3/4" x 48" strips of four species of wood.
2. Clamps to hold strips of wood on each end to table.
3. Weights to measure breaking point of each strip of wood.
4. Balance to measure the mass of the wood.

***Total Duration***

1 hour 30 minutes

***Assessment***

Students will be assessed on the written portion of the lab activity in which they construct a data table that contains the density and breaking strength of each species of wood. Students will then be asked a series of questions concerning the relationship between physical properties of wood and potential uses.