

What's Up with Wood Grain

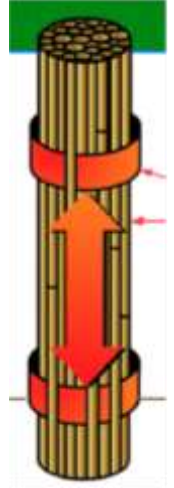
This activity gets us acquainted with the influence of grain direction in the construction of wood-based composite products.

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Background

The majority of wood cells in a tree grow vertically, parallel to the tree stem. The direction of these cells is called the wood "grain". Trees get strength to hold up branches and stiffness to resist bending due to a combination of the direction of the wood cells (the grain) and the lignin adhesive that holds the cells together. Wood products are also strongest and stiffest parallel to the wood grain direction.

Plywood is a good example of using our knowledge of wood grain to create a product that is stronger and stiffer than the wood raw materials yet it requires less material to produce. Plywood is made by stacking several sheets of thin layers of wood called veneer with the wood grain at right angles to each other. Other engineered building products such as chipboard are made of small particles of wood mixed with adhesive to provide excellent strength in all directions because the wood grain is also in all directions.



Materials

Several thin pieces of wood veneer; 6" x 6" is a good size, but other sizes can work too.
Paint and brushes to paint arrows on the veneer surface parallel to the grain helps but not required.

Instructions

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1. Select one piece of veneer.
2. Hold the veneer in both hands with the wood grain pointing away from you.
3. **GENTLY** bend the veneer.
 - a. Was it easy to bend?
4. Now, hold the veneer so that the wood grain points toward your hands.
5. **GENTLY** bend the veneer.
 - a. Was the veneer easier or more difficult to bend?
6. Select a second piece of veneer.
7. Stack the second piece of veneer on top of the first, alternating the direction of the wood grain.
8. **GENTLY** bend the veneer stack.
 - a. Was the stack of veneer easy or difficult to bend?
9. Add a third piece of veneer, alternating the direction of the grain in each layer. **GENTLY BEND** the stack.
 - a. Was the veneer stack easy or difficult to bend?
10. Discuss the difference that cross layering the grain had on the stiffness of the wood stack.
11. Discuss other ways wood grain can impact properties and products such as sanding a piece of wood parallel or perpendicular to the grain and splitting across the grain versus along the grain.

