# Angle/Length Jig

## Purpose:

In assembling the roofs for their models, students cut many identical rafter pieces. These pieces need to not only be cut to the right length, but they must also have the correct angles cut on both ends. This jig creates a way for students to make consistent and accurate rafters. It also allows students to cut their rafters based on known measurements of their structure without needing to use trig and Pythagoras to calculate their specific rafter length and angles.

## Functionality:

The base of the jig is a 12” square, with two adjacent sides marked at 1” intervals. Students use the jig by placing a piece of balsa so that one end of the balsa sticks off the jig at the mark corresponding to their roof height, and the other end sticks off at a mark corresponding to the horizontal distance of a rafter, i.e., half their roof width. Then they will cut off the ends of the balsa that hang over the base of the jig by sawing with the saw blade along the edge of the jig.

To help students hold the balsa at the correct position on the jig, a fence is attached to the top of the base with screws that are threaded through slots in the base and the jig. The fence can slide around the top of the base to any position and any angle, and then can be tightened down with wingnuts on the screws. Once the fence is fixed in position, the balsa can be held or clamped against the fence while the cuts are made.

Note that this method does not require calculating the actual length of the rafters since it uses the horizontal and vertical measurements of the rafter to set up the jig.

## Construction:

The base of the jig is a 12” by 12” by 0.125” piece of thin MDF or similar. Two adjacent sides are marked at 1” intervals with notches to be tactilely discernable. A slot is cut along the diagonal of the square, and two more slots are cut parallel to it on either side of it. The slots are just large enough for a #10 screw to slide easily along them.

The fence is a 0.5” by 0.5” by 6” piece of wood, with a slot cut along its length.

One 1.5” #10 screw goes up through the middle slot in the base and through the slot in the fence, and into a wingnut. A second screw goes up through one of the side slots in the base, through the slot in the fence and into a wingnut.

Underneath the base are two rails 0.5” by 0.5” by 0.125” glued along two opposite sides of the base. This is to raise up the base from the table so that the screw heads attaching the fence to the base have room to slide.

## Graphics:

Page 1: Angle Length Jig and Fence. A top view of the completed assembly showing three parallel slots. A rectangular fence overlaps two of the slots, at an angle, connected with wingnuts. Notches on bottom and left of square jig for tactile measurement.

Page 2: Angle Length Jig 1. A top view of the jig base with measurements.

Page 3: Angle Length Jig 2. A top view and side view of the jig base with the rails attached, showing where they are glued to the base. In the top view, rails are shown as hidden lines—dotted, parallel lines.

Page 4: Angle Length Jig Fence. Top view and side view of the fence with overall and slot dimensions.