With a little practice, an aluminum rod can be made to resonate with either transverse or longitudinal waves. For transverse waves, grasp the rod between thumb and forefinger at a nodal point \( \frac{1}{4} \)th of its length from either end and strike it in the center with a "karate chop." The rod can be caught with the chopping hand at the other node and held up for the class to see.

To produce longitudinal waves, grasp the rod at any point which is a potential node. Remember that this is a system open at both ends, so nodes can be found at the midpoint of the rod, \( \frac{1}{3} \) of its length from the end, \( \frac{1}{6} \)th of its length, and so on. Dip the right finger and thumb in powdered rosin and stroke the rod with a "stretching" motion. The rod will produce an intense, high-pitched tone similar to a tuning fork but much louder. Touching the resonating rod at any point which is not a node will immediately dampen the vibration.

Several other phenomena can be demonstrated with the rod. If the rod is grasped in the center and stroked, the two ends form coherent sound sources which produce interference patterns throughout the lecture room as in demonstration SD-1 (which see). By using an audio oscillator to estimate the frequency of sound produced, an approximate value for the velocity of sound in aluminum can be calculated. (The length of the rod is 6 ft.) By using three identical rods and the aid of students a "chord" can be produced consisting of the fundamental (node at midpoint) and the first two overtones (nodes at \( \frac{1}{4} \) and \( \frac{1}{6} \) points.)