



## Instructional Guide

# Metal Resonance Strips

Part# P7-1500-05



### Contents:

1 ea. 3 Resonance Strips (fully assembled with banana plug connector)

### Required but not included:

*Sine Wave Generator*

*Mechanical Wave Driver*

### Teacher's Background Knowledge

Resonance is the condition in which energy is transmitted between two oscillating objects. Resonance occurs when one is the driving force and its frequency is varied until it matches a natural frequency of the other oscillating object. The metal strips in this apparatus have natural frequencies of oscillation related to their length.

### Introduction to the Apparatus

A time-dependent driving force is provided by the Mechanical Wave Driver. When the frequency of the wave driver matches a natural frequency of the metal strips, a standing wave pattern will form in the metal strips. Since the length of the standing waves must be matched to the length of the metal strips, resonance will occur at different frequency for different length strips. While one strip resonates with large amplitudes, the other metal strips will appear almost motionless. The nodes and antinodes along the resonating strip are clearly apparent and their wavelengths can be measured.

Set up the experiment as shown below.



1. Rotate the metal strips so that they are at equal angles from each other.
2. Insert the banana plug of the metal strip into the driver shaft of the Mechanical Wave Driver.
3. Connect the Mechanical Wave Driver to the sine wave generator using two banana plug cables.

### Getting Familiar / Experimenting

With the amplitude of the Sine Wave generator turned low, start with a low frequency of about 5 Hz output from the function generator to the wave driver. Increase the amplitude, and gradually increase the frequency until resonance occurs in the longest strip. Continuing to increase the frequency will establish resonance with the shorter strips.

