

# Resonance in a closed pipe

## Determining the Speed of Sound in the Classroom

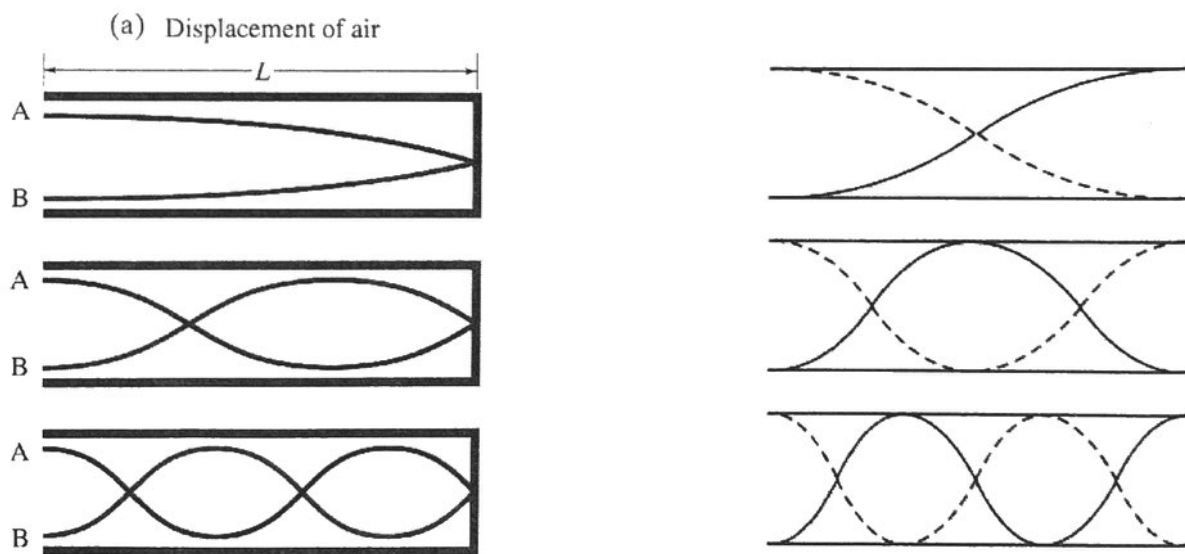
### Introduction

Over the last few weeks, we explored wave concepts and the mathematical equations that model wave behavior. We then explored the standing wave, the self-reinforcing wave reflected back on itself. Up to now we've focused upon vibrating strings, e.g. pianos, harps, guitars, among others to illustrate standing waves. Now we are going to explore different resonance as we begin to move increasingly into sound.

### Discussion

You've seen and heard the vibrating glass. I suspect you have blown across a bottle and heard a note. Are there any strings in a flute, a pipe organ, or trumpet? Don't they also make music, i.e. play multiple notes?

In today's activity, we will be exploring resonance in air columns, which are illustrated below. The one on the left shows is a 'closed' pipe and the one on the right an open pipe.



### Objective

If we wished to measure the speed of sound in the room right now. How might we do it based upon what we know so far?

### Product

Lab report, graphical analysis, verbal discussion with Ms. Mikula/Mr. Patterson, or prepare a comparison of the phenomenon using real world examples.