# Sound Resonance Tube

**Apparatus**

Resonance Tube (eg perspex tube, about 75 cm long and about 5 cm internal diameter), meter ruler, large measuring cylinder, meter ruler, clamp stands (2), set of tuning forks.

**Setting up the apparatus**

1. Observe the set up of the resonance tube and draw a diagram.

# Experiment

**Closed Tube**

1. Make a calculation for the length of the tube at resonance for the first tuning fork (remember l = λ/4) taking 330ms-1 as the approximate speed of sound in air.
2. Insert the tube into the water reservoir so that the tube length is now approximately the calculated length.
3. Set the tuning fork vibrating using the mallet and then adjust the length of the tube to obtain a resonance. At resonance the volume should be noticeably higher.
4. Sketch the wave amplitude along the tube. Mark on your sketch nodes, antinodes and their positions. Make sure you mark the open and closed ends of the tube on your sketch. Which overtone/harmonic does you sketch show?
5. Calculate the speed of sound using v = f.
6. Repeat process for remaining tuning forks.

# Extensions

1. Measure the length (L) and diameter (d) of the tube and the air temperature in the tube.
2. Calculate the speed of sound (v) using the equation v = 2(L + 0.8d)G. How does this compare with the accepted value of v = 331.5 + 0.607 T where T is the air temperature in Celsius? , how does this compare with your estimated value?