MC-SOUNKIT
Sound Measurement Kit

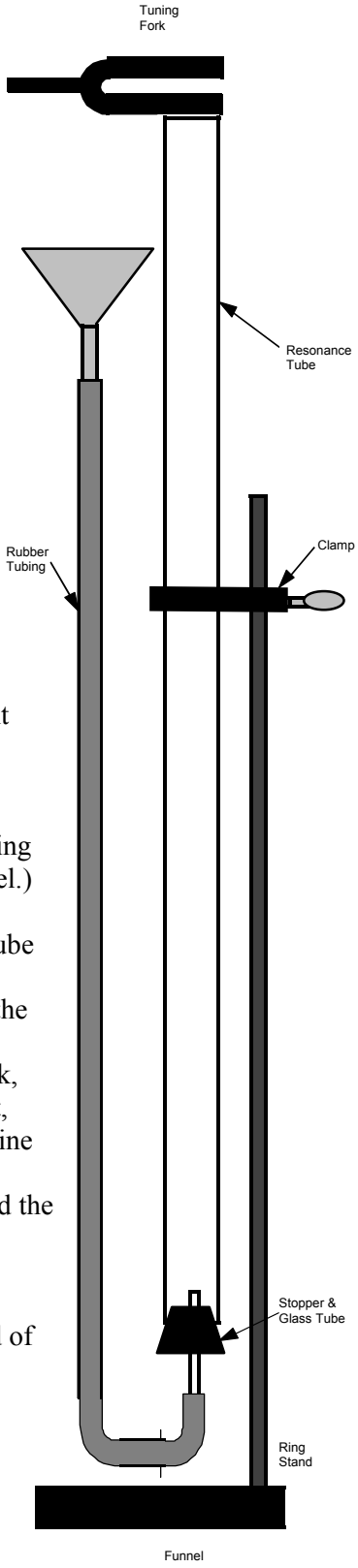
A sound measurement apparatus is used to measure sound wavelengths. You will use a tuning fork to produce a standing wave in the resonance tube. A standing wave occurs when the sound wave from the tuning fork is reflected back upon itself. When the standing wave is produced in the resonance tube you will hear a higher intensity deep sound. Standing waves occur when the distance from the tuning fork to the water level is 1/4 wavelength, 3/4 wavelength, etc.

NOTE: Requires a ring stand and clamp.

Components: This sound measurement kit contains a resonance tube, plastic 8 oz. funnel, #1 rubber stopper, piece of glass tubing, a length of rubber tubing, and a 512 cps tuning fork.

Assembly:

1. Insert one end of the glass tube into the stopper. Attach one end of the rubber tubing to the end of the glass tube sticking out of the stopper.
2. Unpack the resonance tube and firmly insert the rubber stopper in one end of the tube.
3. Stretch the other end of the rubber tubing until you can attach it to the tip of the funnel.
4. Use a ring stand to hold the resonance tube as shown in the diagram.



Use:

1. Hold the funnel at the top of the resonance tube and fill the resonance tube with water using a large beaker or glass. (This works best with 2 people.)
2. Practice lowering the funnel to slowly drop the water level in the resonance tube. Experiment with the funnel until you can easily control the water level. Refill the resonance tube.
3. Tap the tuning fork and hold it so the tines are located horizontally over the mouth of the resonance tube, 2-3 mm above the top of the tube.
4. Slowly drop the water level in the resonance tube until the sound intensity increases, producing a deep sound. (You may have to tap the tuning fork several times as you lower the water level.) When you reach this point, raise and lower the water level a few times while listening to the tuning fork to determine the exact point where the sound is deepest. Mark this point on the tube with a crayon or piece of tape. This is the 1/4 wavelength mark.
5. Tap the tuning fork again and hold it so the tines are located horizontally over the mouth of the resonance tube, 2-3 mm above the top of the tube.
6. Continue to slowly drop the water level in the resonance tube below the 1/4 wavelength mark, until the sound intensity again increases, producing a deep sound. When you reach this point, raise and lower the water level a few times while listening to the tuning fork to again determine the exact point where the sound is deepest. Mark this water level on the tube as the 3/4 wavelength mark. Measure the distance in centimeters between the 1/4 wavelength mark and the 3/4 wavelength mark.
7. Calculate the sound wavelength from the tuning fork with the following formula:
   Wavelength (in centimeters) = 2 x (3/4 wavelength - 1/4 wavelength)
8. Convert the calculated wavelength to meters by dividing by 100 and then calculate the speed of sound with the following formula:
   Speed of Sound (meter/second) = Wavelength (meters) x Frequency (cps)
9. Compare the accuracy of your calculated speed of sound to the actual speed of sound:
   Speed of Sound (meter/second) = 330 + 0.6 x Temperature (Celsius)
10. Try this experiment with other tuning forks. (Note that the resonance tube will be too short for some low-frequency tuning forks.)