



Concept:

The audience will hear the buzzer's stationary frequency shifted up as the buzzer moves toward them, and down as the buzzer moves away.

They will thus hear a "wobbling" pitch as the buzzer is swung in a circular motion.

Procedure:

1. Turn on Doppler Buzzer by flipping switch on side of cardboard tube.
2. Hold string at the red marked knot (1 meter from buzzer sound source).
3. Make sure no one is within 1 meter of you.
4. Swing the buzzer overhead in a circle with a constant speed while trying to keep your hand in one place.
5. For a more quantitative approach, have a student use the stopwatch to time how long it takes the buzzer to complete 10 revolutions. Refer to **Notes and Extras** for a quantitative calculation.

Notes and Extras:

- [Video Link](#)

The shifted frequency is given by: $f' = \frac{v_s}{v_s \pm v} f$ where $v = \frac{2\pi r}{T}$

- $v_s = 343$ m/s
- $r = 1$ meter
- $T =$ the period of revolution = period for 10 revolutions /10
- $f = 2.7$ kHz
- $+ (-)$ means source moves away from (toward) the observer

Note that for $T = 0.5$ s, the shifted frequency is about 4 % less or greater than the unshifted.

Equipment:

- Doppler Buzzer
- Stopwatch (for quantitative measurement)