Calculating the Speed of Sound.

IMPACT 2017

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Materials:

Stopwatch
3-large inflated balloons
Pin to pop the balloons
Meter stick, yardstick or trundle wheel
We will measure a distance of 100 meters or 109 yards.

The **equation** for **speed** is distance traveled/time to travel that distance. Using the example length of 100 m (328 ft), if the **runner** took 10 seconds to run that distance, the **runner's speed** would be 100 m (328 ft) divided by 10, or 10 m/sec (32.8 feet per second).

We will be measuring the speed of sound in air using a balloon. The time is going to be a fraction of a second.
Using a stopwatch measure your reaction time.
Press the start and stop button. What is the time on the stopwatch?
My reaction time is .23 seconds.
Try it yourself a few times to get an average.
Another way to check your reaction time is the old fashion way.
See the attached worksheet " Reaction Timer" and chart.
Compare your reaction times. How close are the times from the stopwatch and the ruler?

We will need to subtract your reaction time from the time you heard the balloon pop.
Example: I measured .50 seconds from the time I saw the balloon pop until I heard the sound.
.50-.23 = .27 seconds.
100 meters / .27 seconds = m/s = 370 m/s
We will repeat this activity 3 times and then take an average.

Practice using the stopwatch several times before doing the experiment
This requires 2 participants a timer and a person to pop the balloon.
The timer will only start the clock when they see the balloon is popped and stop the watch when they hear the sound of the balloon popping.

We will collect data from all the groups and discuss what variables may have affected our results. The following table contains my 3 trials and the average speed of sound.

Distance in meters	Time in seconds	Speed of sound
1. 100	.23	434.8 m/s
2. 100	.27	370.0 m/s
3. 100	.40	250.0 m/s
	Average speed of sound	351.0 m/s

This activity is designed to show students the different between light that we see and the sound that we hear. The delay is less than a second, but still is observable.

Reflection:

I would repeat this experiment several times without using the stopwatch. Watching the balloon pop and then hearing the delay is important to see before actually trying to time the delay.

Remember that your reaction time should be subtracted from each of your timings. Throw out any data that you collect where the time you measured is equal to your reaction time.

Distance in meters	Time in seconds	Speed of sound
1. 100		
2. 100		
3. 100		
	Average speed of sound	