**Physics Experiment with a smartphone app called Phyphox:** [**https://phyphox.org**](https://phyphox.org)

**Speed of Sound, Acoustic Stopwatch, Phyphox**

**Goal: Investigating the speed of sound.**

1. You need two mobile phones with a phyphox app.
2. Choose **Acoustic Stopwatch.**
3. Set the *Threshold* on 0.8 to reduce the background noise.
4. Keep the *Minimum Delay* on 0.1.
5. To do the experiment stand and measure the distance away from your friend/partner. For example, 1 m apart from each other (d= 1m).
6. Clap your hands once. The closer phone starts earlier. The second/farther phone starts later. Therefore, there is a $∆t$.
7. As soon as your friend hears your clap, she/he claps again which stops the first closer timer/phone (which is close to him/her). This is $t\_{1}.$ Your friend's clap will stop your timer/phone later with a delay. This is $t\_{2}$.
8. In each trial, there are 2 claps (both clap one at a time), then there are two times:

$t\_{2}- t\_{1}=$ $∆t. $

1. Attempt the experiment 4 times and have 4 trials.
2. **NOTE that the sound has travelled the distance between you and your partner twice. It means 1 m** $× 2$ **. Therefore, you need to either double the distance or halve the time (**$∆t)$**.**
3. Calculate the speed of sound with this formula:

$$∆t=\frac{d}{v}$$

1. Calculate the average speed and check the accuracy and precision of the result.
2. Fill out the table below.
3. Remember to clap as soon as you hear your friend's clap.
4. Watch the video instruction for this experiment with phyphox app: <https://youtu.be/uoUm34CnHdE>

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Trial** | **Time (s)** | $∆t$ **(s)** | **Distance (m)** | **Sound Speed (m/s)** |
| 1 | $$t\_{1}= $$ |  |  |  |
| 1 | $$ t\_{2}= $$ |
| 2 | $$t\_{1}= $$ |  |  |  |
| 2 | $$t\_{2}= $$ |
| 3 | $$t\_{1}= $$ |  |  |  |
| 3 | $$t\_{2}= $$ |
| 4 | $$t\_{1}= $$ |  |  |  |
| 4 | $$t\_{2}= $$ |
| Accuracy |  |  |  |  |
| Precision |  |  |  |  |

Average Speed of Sound = ……………. m/s.

**Question:**

**What if you change the distance? Attempt with different distances and investigate the result (speed of sound). You may use your lab report template or the table above again.**