Period and Frequency of a Tuning Fork

Purpose:

To determine the period and the frequency of a tuning fork.

Getting Ready/Getting Acquainted:

Navigate to the Audio Analyzer at The Physics Classroom website.

www.physicsclassroom.com ➔ Physics Interactives ➔ Waves and Sound ➔ Audio Analyzer

https://www.physicsclassroom.com/Physics-Interactives/Waves-and-Sound/Audio-Analyzer

Tap the **Play** button (near bottom of the Interactive). A pop-up is displayed with a standard question that arises whenever a website needs access to the camera or microphone input of a device. Grant permission for the website to access the microphone to record and analyze sounds. Make a *pretty* sound and observe the FFT and Oscilloscope displays. Press the **Pause** button the moment you see the resemblance of a wave in the Oscilloscope display. Once paused, *mouse over* the display and observe the pressure-time readings displayed below the graphs. Once you're comfortable with the interface, proceed to the **Procedure** section below.

Audio Analyzer
FFT Display
Oscilloscope Display
Pressure and time for mouse location.
0.472 Pascals
0.00831 seconds
Pressure in Pascals is an estimate based on typical laptop microphone sensitivity.
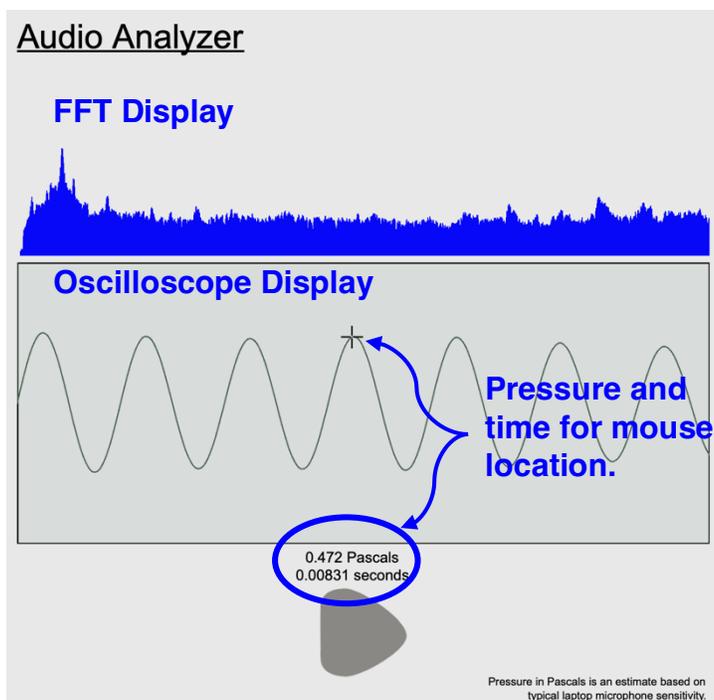
Procedure:

1. Acquire a tuning fork and a rubber *activator*.
2. Use the rubber activator to vibrate your tuning fork. Tap the **Play** button and bring your tuning fork near the microphone of your device. Capture the sound of the tuning fork and tap the **Pause** button the moment a sine wave appears.
3. If a good-looking wave appears on the screen with regularly occurring peaks and troughs, you can proceed to Step 4. Otherwise, repeat Step 2.
4. Depending on your teacher's preference, either print the graph or take a screenshot of the graph (Oscilloscope display). The graph will become part of your Data section. You will record data on the graph and use the data as the basis of your calculations. Keep your computer open to Audio Analyzer; you will still need it to collect data.
5. In Audio Analyzer, mouse over the first peak of the Oscilloscope display. Note the pressure and time. On your printout (or screenshot), record the pressure and time associated with this peak.

6. In Audio Analyzer, mouse over the last peak of the Oscilloscope display. Note the pressure and time. On your printout (or screenshot), record the pressure and time associated with this peak.
7. Count the number of cycles or oscillations occurring between these two times. Record on the graph … like "11 cycles".
8. Use a calculator to determine the time for this number of cycles. (Subtract the two times and record the result on the graph … like "Δt = 0.0233 seconds".)
9. Now that you have the # of cycles and the time, calculate the frequency and the period. **SHOW WORK** for the calculations. Label result with a symbol and a unit … like "f = 472 Hz" and like "T = 0.00212 seconds".

Data:

Include a print-out or screenshot of your pressure-time plot with your lab report. Organize your calculations on the print-out. This includes measured times and the number of cycles between the two times. (Your teacher may provide additional or alternative directions. All measurements and calculations should still be included in your report.)

Conclusion:

The frequency of the tuning fork was determined to be _____ Hz and the period of its vibrations was _____ seconds.