

Physics Investigation 2 Task Sheet

Observation

Notes of different pitches can be produced by a musical instrument such as a guitar.

Problem

How can the pitch of the notes produced by a musical instrument be varied?

Hypothesis

Aim

Principle

Sound is produced by vibrating objects. If the pitch is higher, the frequency of vibration is higher. When a microphone, linked to a sound sensormeter, is used to detect the sound produced, its vibration can be shown graphically on the computer.

In this investigation, the following variables are involved :

independent variables : _____

dependent variable : _____

Equipment and materials

- one desktop computer
- one datalogging interface
- one sound sensormeter with an external probe
- one guitar

Set-up

Photograph showing set-up of guitar, sound sensormeter and datalogging interface



Procedure

1. Connect the sound probe to the sound sensormeter;
2. Then connect the sound sensormeter to the computer via the datalogging interface;
3. Select the "**wave**" mode on the sound sensormeter;
4. Choose the "**fast**" mode for recording on the computer. Then click the "**100ms**" and start recording by clicking the record button.

Experiment a

1. Pluck one string of the guitar;
2. Record the sound into a wave graph on the computer;
3. Measure the frequency (number of cycles in one second) of the note from the wave graph;
4. Press hard on the middle of the string to reduce its length;
5. Pluck the string again;
6. Repeat step 2 and step 3;
7. Compare the two wave graphs produced.

Experiment b

1. Pluck one string of the guitar;
2. Record the sound into a wave graph on the computer;
3. Measure the frequency (number of cycles in one second) of the note from the wave graph;
4. Tighten the string by turning the tuning peg;
5. Repeat step 2 and step 3;
6. Compare the two wave graphs produced.

Precautions

1. As the frequencies of the notes produced are hundreds cycles per second, the time of recording should be short e.g. 100ms;
2. Ensure the experiment runs in a quiet room.

Results**Interpretation****Possible errors****Improvement****Conclusion**