

Tap 311- 4: Exploring waveforms with Multimedia Sound

Use the sound analysis software Multimedia Sound to explore the waveforms of the sound from a variety of sources.

Apparatus

- ✓ Multimedia Sound CD-ROM (see above)
- ✓ multimedia PC with microphone and speakers

Equipment for making various sounds, e.g.:

- ✓ signal generator 1 speaker
- ✓ tuning forks 1 large corks or board-rubbers (for striking)
- ✓ musical instruments (loaned by students?)
- ✓ anything else found around the lab that can be banged, twanged, clanged or blown

Waveforms of pre-recorded sounds

Use the Multimedia Sound CD-ROM to examine, and make a simple sketch of, waveforms for the following sounds which come pre-recorded and stored on the CD-ROM: clarinet, glass beaker, guitar, metal rod, ratchet, tuning fork.

Initially, when you load the sound, you may not be able to see the waveform as a single, discernible line, as it is too 'squashed up'. When this occurs, keep using the zoom facility on a section of the waveform until it appears as a single line.

TAP 311-5: Multimedia Sound: studying a pre-recorded sample

Importing your own sounds

Use a sound recording application to record short sound samples of your own; the human voice, for example, can produce many types of sound. You can also try whistling or anything else using common objects found in or around a lab.

Import your sound samples into Multimedia Sound, then view and sketch their waveforms.

What common properties are shared by all the waveforms you have studied?

- describe the differences.

Which waveforms are fairly similar? Can you suggest a reason for this?

Make a list of all the sounds you have analysed and, next to each one, write down what you think is vibrating to produce the sound.

TAP 311-6: Multimedia Sound: recording your own sound sample

Practical advice

One aim of this activity is to introduce students to Multimedia Sound, while also reinforcing the general ideas of pitch and amplitude and introducing students to some more complex waveforms.

Additional instructions for displaying pre-recorded sounds:

TAP 311-5: Multimedia Sound: studying a pre-recorded sample

Guidance for students recording their own sound samples:

TAP 311-6: Multimedia Sound: recording your own sound sample

You might decide to defer the latter to another occasion – but that would probably make the activity less enjoyable.

Try to make sure that students are zooming in to view the single line of the waveform, but not so far that any pattern and periodicity are lost.

A ratio of one PC per six students is recommended. Multimedia Sound analyses WAV files, the standard audio file type for Windows. The files must carry a format of 22050 Hz 16 bit Mono to be analysed by Multimedia Sound. We suggest that students use Windows' own Sound Recorder to record samples.

Technician's notes

Sound producers could include: glasses to 'ping'; glasses to 'sing' (by rubbing a damp finger around the rim); freely suspended metal sheets to 'clang'; bells, bottles to blow across and to tap; elastic bands to twang. Be as imaginative as you like – the more varied the range of sounds, the better.

Arrange a folder within 'csmsound' and make this the default 'Save As' folder from the Sound Recorder.

This unit makes extensive use of the Multimedia Sound CD-ROM. This CD is available from:
Cambridge Science Media, 354 Mill Road, Cambridge CB1 3NN

Phone: 01354 652312

<http://www.csmedia.demon.co.uk>

Fax: 01223 573994

e-mail: sales@csmedia.demon.co.uk

Running the CD-ROM requires the following:

- 486DX–40 MHz or higher processor
- Microsoft Windows 3.1 or Windows 95/98
- at least 4 MB RAM for Windows 3.1 (8 MB recommended) or 8 MB RAM for Windows 95/98
- VGA graphics capable of displaying 256 colours or above
- MS-DOS 5.0 or above
- CD-ROM drive, double speed
- 16-bit sound card

- mouse
- microphone

External reference

This activity is taken from Salters Horners Advanced Physics, section TSOM, activity 3