Bitesize GCSE Science - Physics

Sound waves

BBC Radio Sound Engineer Tom Parnell on sound waves

There are several radio studios here at Media City and they are all isolated from the outside world with thick walls, double glass windows and with sound treatment inside so that we can control the reflections of sounds within the rooms.

We have sound boxes on the walls which will absorb some sounds but will also reflect other sounds to make it sound like you are hearing it now.

My job as a Sound Engineer is to collect the sound of contributions perhaps an orchestra or a pop band or a DJ on his programme. We use microphones in the studio which will collect those sounds and transfer them into electrical signals which can then be processed, edited and then transmitted – which is what you hear on your radio at home.

Microphones collect the sound waves that travel through the air and transfer them into an electrical signal. They have a diaphragm in them which vibrates with the sound waves and an electromagnet collects the electrical impulses that changes the sound pressure changes.

At Media City this is recorded digitally on a computer ready for editing later.

For the different things we are recording we use different microphones. So for an orchestra in a concert hall I might want to record the sound of the musicians but also the sound of the concert hall itself – the reverberation. For this I might us an omnidirectional microphone that picks up sound from all around.

In the studio it slightly different there are reflections in every room and we try to minimise those with sound treatment but also with the use of different types of microphone. I might use a directional microphone in the studio for a DJ in order to focus the sound of his voice.

Once we've collected all these sounds we can edit them using digital audio work stations which provide a visual representation of the audio that we have recorded a bit like where you see a wave form represented on an oscilloscope.

Once we've edited the sound we can produce a programme which is then broadcast over the airwaves. In your radio at home is a loud speaker which transfers the electrical signal that we have broadcast back into sound waves which emanate from the speaker itself. In your Walkman you might have little

ear buds that fit inside your ear with a tiny diaphragm but at festivals they use huge speakers to move a lot of air and create a high amplitude of sound.