

Tutorial 5: Digital Recording techniques

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Objectives: To provide the students an overview of types of microphone, and field recorders.

Method: Each person will have a computer, a pair of headphones and will work with Reaper software.

Outcomes: Each student will import and audio file from freesound.org, will modify the sample by creating a loop, reversing, change the pitch and adding reverb,

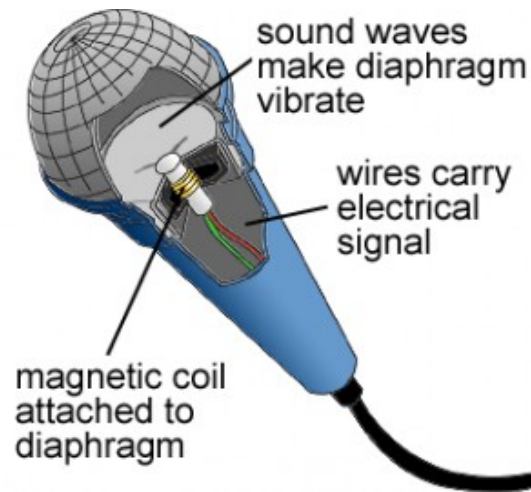
Instructor Materials: Reaper, speaker, projector.

Student material: a computer per team, headphones, usb key, Reaper software, sound recorders.

Lesson Plan

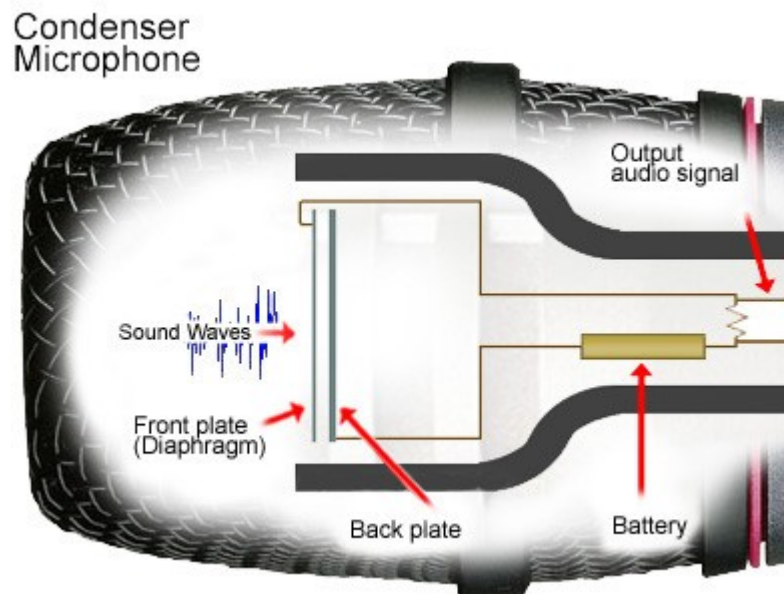
Topic	Activity	Material	Time
Introduction	<ul style="list-style-type: none">Microphone construction: Dynamic vs Condenser mic		5min
Directionality	<ul style="list-style-type: none">Explain types of microphones: Unidirectional, bidirectional, and omnidirectional.	Diagram	5min
Stereo Recording	<ol style="list-style-type: none">Explain 3 common stereo recording techniques: A/B, X/Y and ORTF.	Diagram	5min
Sound recorder basics	<ol style="list-style-type: none">Explain sound recorder basic functions: Set sample rate, bit depth, set headroom between -10 and -20 dB before recording.	Diagram and Sound recorder	5min
Exercise (outdoor)	<ol style="list-style-type: none">In groups of three record two sounds:<ol style="list-style-type: none">Close from the sourceDistant from the source.Import file to reaper.	Sound recorder and Reaper	30min
		Total Time	50min

Dynamic microphone



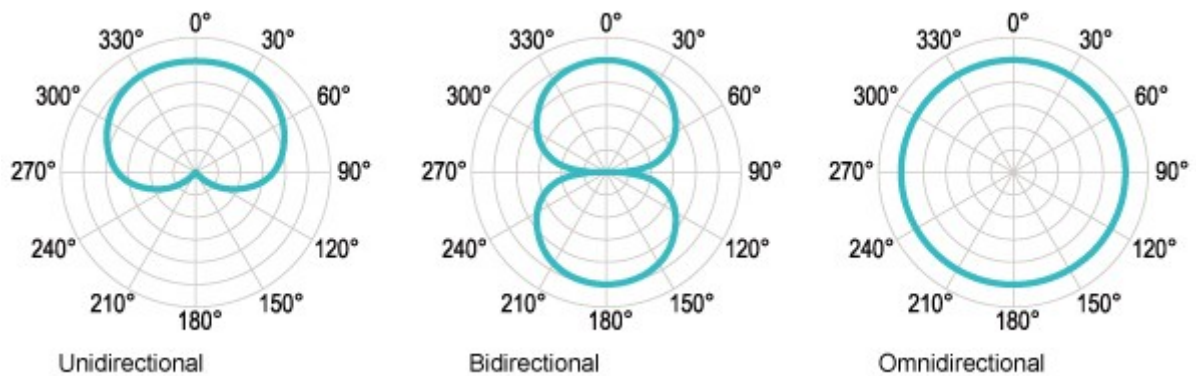
A dynamic microphone is like a loudspeaker in reverse. The air moves a filament attached to a coil inside a magnet. The motion of the coil inside the magnet generates an electrical current (and voltage).

Condenser microphone



With condenser microphones, the air moves a tiny filament that changes the capacitance (ability to store energy) of a circuit. In other words, unlike the dynamic microphone the condenser microphone does not generate electrical energy, it only modulates or changes the form of energy that is already provided to it electrically.

Directionality



An **unidirectional** (cardioid) microphone is a microphone that is more sensitive in one direction than all others. If a sound source is not directly in front of the microphone, the strength of the signal from that source will be attenuated.

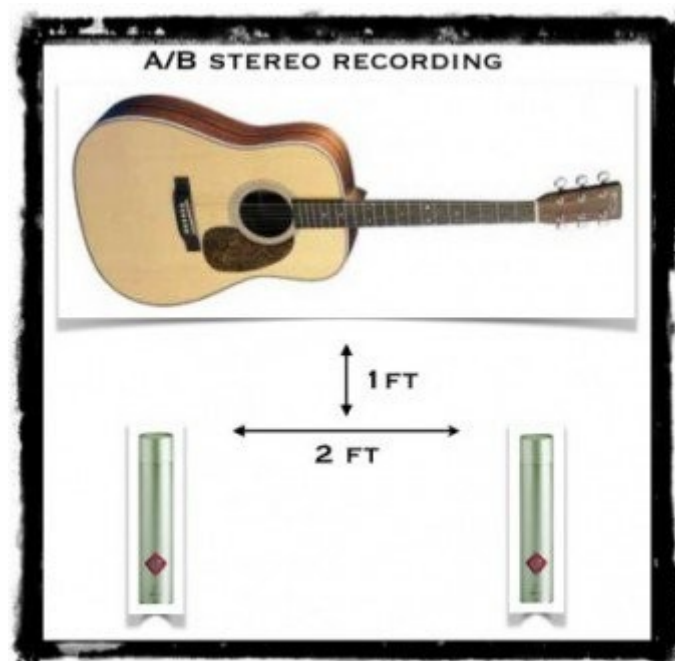
A **bidirectional** microphone features directionality to the front and rear.

An **omnidirectional** microphone is a microphone that is equally sensitive in all directions. If a certain sound source at a certain distance is in front, behind or beside the microphone it makes no difference to the strength of the signal picked up.

Stereo Recording techniques

Is sound recording by using two microphones. The purpose is to have a more realistic recording by getting **difference in timing** and **difference in frequency balance**.

A/B recording: using 2 omnidirectional mics. Sound arrives with a slightly time difference.



X/Y recording: using 2 unidirectional mics. No differences in timing.



ORTF recording: using 2 unidirectional mics. Great difference in timing.

