Lighting, Sound & SFX - Unit 2

Content Area: **Theater**
Course(s):
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Career Readiness, Life Literacies & Key Skills

TECH.9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
TECH.9.4.12.CI.2	Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).
TECH.9.4.12.CT.1	Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).

Key Resources

Theatre: Art in Action, National Textbook Company/Contemporary Publishing Group, Inc. 1999

ETC Stage Lighting Design: An Introduction Educators PDF

ETC Ion Xe lighting Console in LHS Theatre

LHS Tech Theatre Laptops with EOS Software

Interdisciplinary Connections

SCI.HS-ETS1-2	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

Intersections of History

Black: Important persons of this demographic in the industry. Example: Twi McCallum.

Hispanic: Important persons of this demographic in the industry. Example: Germàn Martinez.

Women: Important persons of this demographic in the industry. Example: Jessica Paz

LGBTQ: Important persons of this demographic in the industry. Example: Ien Denio

Important Vocabulary

ABSORPTION - The ability of a surface to absorb sound. The absorption coefficient of a material is a figure between 0 and 1, representing its degree of absorption.

ACOUSTICS - The behavior of sound and its study. The acoustic of a room depends on its size and shape and the amount and position of sound-absorbing and reflecting material. The quality of sound in a given space, measured and analyzed by its clarity, loudness, liveliness, reverberance, echoes, dynamic range, envelopment, spaciousness, warmth and silence or noise control rating.

AMBIENT NOISE - The sound heard in a given room with no sound sources. Each space has a particular sound which aids our identification of the kind of space we're in.

AMPLIFIER - Sound equipment that amplifies/boosts the low voltage, low current audio signal from a computer, mixing desk etc. into a higher current signal suitable for driving speakers.As a general rule, each speaker in a sound system requires a separate amplifier. Each amplifier unit usually contains two amplifiers (for the two stereo components (left and right) of the sound signal), so with a single amplifier box, you can drive two speakers.

ARRAY - A set of loudspeakers flown in a performance space. See also CLUSTER.

ATMOSPHERIC SOUND - Ambient or Atmospheric sound can be used to define a location or to help the audience to understand the world of the play better. In live performance, it consists of subtle and carefully balanced audio effects which should not overshadow the performance, but set the scene. The recording of atmospheric sound is known as the 'wild track'.

BUSS - A signal line within a sound mixing desk that can receive its signal from a number of sources. eg the

Aux 1 buss carries the signals from the input channels to the Aux 1 Send master control.

CLICK TRACK - Technique for reinforcing the live sound of a musical or band with recorded sound from one track of a tape. The other track of the tape consists of a click used by the musical director to keep the live band and cast synchronized with the recorded band or cast.

CLIPPING - Distortion in a sound signal caused by an amplifier or mixer being unable to handle the level of signal being fed to it.

CLUSTER - Generic name for a grouping of loudspeakers hung in a performance space. (e.g. The central cluster). Also known as ARRAY.

DUBBING - The process of copying a sound from one medium to another (e.g. onto videotape) or for backup purposes, or simply copying sound tapes.

EFFECTS / SOUND EFFECTS / SFX

1) Recorded : Often abbreviated to FX. There are many sources for recorded sound effects, from Compact Discs, to downloading from the internet. May form an obvious part of the action (train arriving at station) or may be in the background throughout a scene (e.g. birds chirping).

2) Live : Gunshots, door slams, crashes and offstage voices (amongst many others) are most effective when done live.

EQUALIZATION - The process of adjusting the tonal quality of a sound. A graphic equalizer provides adjustment for a wide range of frequency bands, and is normally inserted in the signal path after the mixing board, before the amplifier.

FADE - A fade is an increase, diminishment or change in lighting or sound level; i.e., “Fade that cue up.”

FADER - A vertical slider that is used to remotely set the level of a lighting or sound channel.

FEED/POWER FEED

1) A power supply to a piece of equipment or installation. Sound equipment and sensitive computer equipment should have a clean feed - that is, a supply that is free from interference from other equipment. This feed usually has an isolated ground, or a ground not connected to any other electrical ground in the building,

especially the ground for the lighting system.

2) A signal from one system to another (for example, an audio signal from the FOH board to a TV company videotaping a concert is known as a feed.

FEEDBACK / LOOP - A loud whistle or rumble heard emanating from a sound system. It is caused by a sound being amplified many times. (E.g. a sound is picked up by a microphone and amplified through the speaker. The microphone picks up this amplified sound and it is sent through the system again). Feedback can be avoided by careful microphone positioning, and can be reduced by use of equalization to reduce the level of the frequency band causing the feedback.

FILLS - Term for speakers additional to the main PA to improve the sound in particular locations; e.g. "Front fills" add sound at the front of the auditorium that might be just out of range of the main PA stacks at the sides of the stage.

FILTER - Electronic device to isolate and redirect specific frequencies in a speaker system.

FREQUENCY - (measured in Hertz - Hz - cycles per second) The number of times a sound source vibrates each second. A high frequency (HF) sound has a higher pitch and is unidirectional. A low frequency (LF) sound has a lower pitch and is omnidirectional.

GAIN

1) The level of amplification given to a signal or of a system.

2) A control of the amount of pre-amplification given to a sound signal on its way into a mixer.

LAVALIER MICROPHONE - Originally, a mic worn around the neck on a string. Now applies to a small "tieclip" microphone.

LINE LEVEL SIGNAL - "Standard" level at which the inputs and outputs of domestic and professional sound equipment operate. Slight variations are that some equipment works at +4dB, some at -10dB.

LOUDSPEAKER - Device for converting the electrical signal from an amplifier back into sound waves, most commonly b vibrating a paper cone. Most speaker systems are composed of a number of sources - each designed to handle a specific range of frequencies.

MASTER

1) An overall control on a lighting or sound control board.

2) An original (e.g. Master tape) that should be used only to make a copy from which to work.

MICROPHONE - Device for converting sound into electrical pulses that can then be amplified or recorded onto tape. Signals from a microphone are very low level and are amplified in the mixing board to line level.

Omnidirectional microphone has equal pick-up from all around. Cardioid microphone is more sensitive from the front. Hypercardioid has very strong directionality from the front.

MIDI - Musical Instrument Digital Interface. Control system established in 1984 for linking musical instruments or other electronic equipment and computers together and storing the control signals the equipment produces for subsequent playback.

MIXDOWN - The process during which a multitrack recording is balanced and transferred to two tracks (stereo) for playback or reproduction.

MIXER - A board comprising a number of input channels where each sound source is provided with its own control channel through which sound signals are routed into two or more outputs. Many mixing boards can also change the quality of the sound (see EQUALIZATION). A Powered Mixer has an amplifier built into it. Sound sources of varying levels are accepted that can be amplified if necessary.

MONITOR

1) An onstage speaker that allows a performer to hear the output of the PA system, or to hear other instruments/members of the band.

2) A video display screen used with a CCTV system or a computer.

NOISE GATE - A piece of sound processing equipment that reduces background noise by muting a sound signal when it falls below a certain level, restoring it when the level increases again. Must be used on vocal microphones with care, because it may cut the signal off, although the vocalist is still singing quietly.

OVERHEADS

1) Microphones positioned above a drum kit to pick up the cymbals etc. without getting hit.

2) Microphones positioned over the stage to pick up the overall sound of the concert / production.

PAD - A switch on a mixing board input channel that attenuates (reduces the level of) a signal. Used if a loud /high level signal is causing the board to be overloaded.

PAN - A control on a mixing board that allows the operator to position the channel's output in the final stereo image (L - R).

PATCH BAY - Used to connect outboard equipment into the sound board and to connect sound board outputs to amplifiers, and amplifiers to speakers.

PATCH CABLE - Any cable that connects one device to another, either directly or through a patch bay.

PICK-UP

1) Device that, when attached to an acoustic musical instrument, converts sound vibrations into an electrical signal.

2) A way of describing the directional sensitivity of a microphone.

PLOT / SOUND PLOT

1) List of preparations and actions required of technical crews during the performance. For example, Sound Plot is list of sound cues and levels and sound placement in running order. In the US, the term plot may also refer to a plan. (e.g. Light Plot = scale plan showing lighting instruments).

2) The basic story thread running through a performance / play that gives the reason for the character's actions.

POP SCREEN - A thin gauze screen placed between a singer and a microphone to reduce vocal "popping" and other

breath noise. This noise is particularly produced by pronunciation of plosive sounds (P, B, T). A foam shield placed over the end of a microphone to reduce the pick up of vocal "popping" and external wind noise.

PUBLIC ADDRESS SYSTEM / PA SYSTEM - The venue auditorium sound system. Most theatres will have a separate sound system for emergency

announcements in all public areas of the theatre. This system may also be used for Front of House calls. The Rear of House calls system often also acts as a SHOW RELAY, conveying the sound of the performance to remote parts of the theatre building.

RACK - A cabinet of standard width (19") into what various components can be bolted. Racks are ideal for touring equipment, are neat, and they allow easy access to the rear and front panels.

REVERB / REVERBERATION - Effect that may be added to sound effects during recording or to a voice during performance. Sustains

the sound longer than normal, as if the sound was reverberating around a large building (e.g. cathedral).

SAMPLER - Electronic device for recording a series of sounds digitally so that they are available instantly for playback. Samplers for theatrical use have a number of independent outputs to which any sound sample can be sent at any time. Samplers can be controlled by a MIDI keyboard or by computer control.

SAMPLING - The technique of recording a sound digitally (translating the analog audio waveform into a series of electrical ons and offs that can be manipulated by a computer) for subsequent processing, editing and playback.

SEQUENCING - An act of recording digitally and manipulating the MIDI information required to remotely play a synthesizer keyboard or similar device.

SHIELD - In an audio cable, a conductive cylinder around one or more center conductors that protects against unwanted electrostatic fields that could induce a signal, heard as a hum or buzz, across the conductors of the cable.

SOUND CHECK - A thorough test of the sound system before a performance. This includes checking each speaker cabinet individually, and each playback device. In the case of a live concert, this is the session when each instrument is played in turn for the sound engineer to check and fine-tune the sound. In the case of live theatre, this is the session in which all playback systems and wireless and zone microphones are checked and fine-tuned.

SQUELCH – Control on a radio microphone receiver for fine-tuning the reception according to the surroundings.

TRACK - Separate audio recording channel. Most playback / recording devices have two tracks - left and right. Some are used for MULTITRACK RECORDING and allow either four or eight tracks to be recorded onto standard media (see also DIGITAL RECORDING). Many more tracks can be recorded onto computerized systems. The most important feature of a multi-track system is the ability to record and playback at the

same time (e.g. Recording vocals on track two with a pre-recorded piano on track one.)

TWEETER - Part of a speaker system designed to handle the high frequency part of the signal.

WAVELENGTH - The distance from one point on a vibrating wave to the same point on the next wave. The lengths of the sound waves (wavelengths) we can hear range from one inch to 40 feet. High frequency sounds have short wavelengths (and are more directional), low frequency sounds have long wavelengths (and are less directional).

WEDGE - A wedge-shaped foldback speaker. Angled so that it can sit on the stage floor and point up at musicians/cast.

WOOFER - Part of a speaker system designed to handle the low frequency parts of the signal.

XLR - Multi Pin metallic connector. (3-pin for normal sound use, 4-pin for Color Scrollers etc., 5-pin for DMX). Sometimes called Cannons after the original manufacturer.