A SOUND DESIGN

Easy and Impactful Methods for Building Better Immersive Soundscapes

Troy Armstrong

RECON 2026 . Immersive Experience Design Conference



Credit: "God of War: Ragnarok" Sound Design Team

FOUR PILLARS OF *SOUND* DESIGN



CLARITY





IMPACT





IMMERSION





SPECTACLE



Credit: "God of War: Ragnarok" Sound Design Team

FOUR PILLARS OF *SOUND* DESIGN



CLARITY

Sounds are DISTINCT and INTELLIGIBLE





IMPACT

Sounds CAPTURE the players' ATTENTION





IMMERSION

Sounds INCREASE world BELIEVABILITY





SPECTACLE

Sounds IMBUE the game with WONDER



Credit: "God of War: Ragnarok" Sound Design Team

JOUSTING BOX

CLARITY



IMPACT





IMMERSION



SPECTACLE



GUIDING PRINCIPLES
for EFFECTIVE AUDIO

Guiding Principle 1 of 8

Provide audio feedback at EVERY opportunity

Mindframes for Visible Learning

by John Hattie

- **Relevant Feedback**
  - **Timely Manner**
  - **Consistent Communication**
    - **Praise**
    - **Criticism**
    - **Advice**



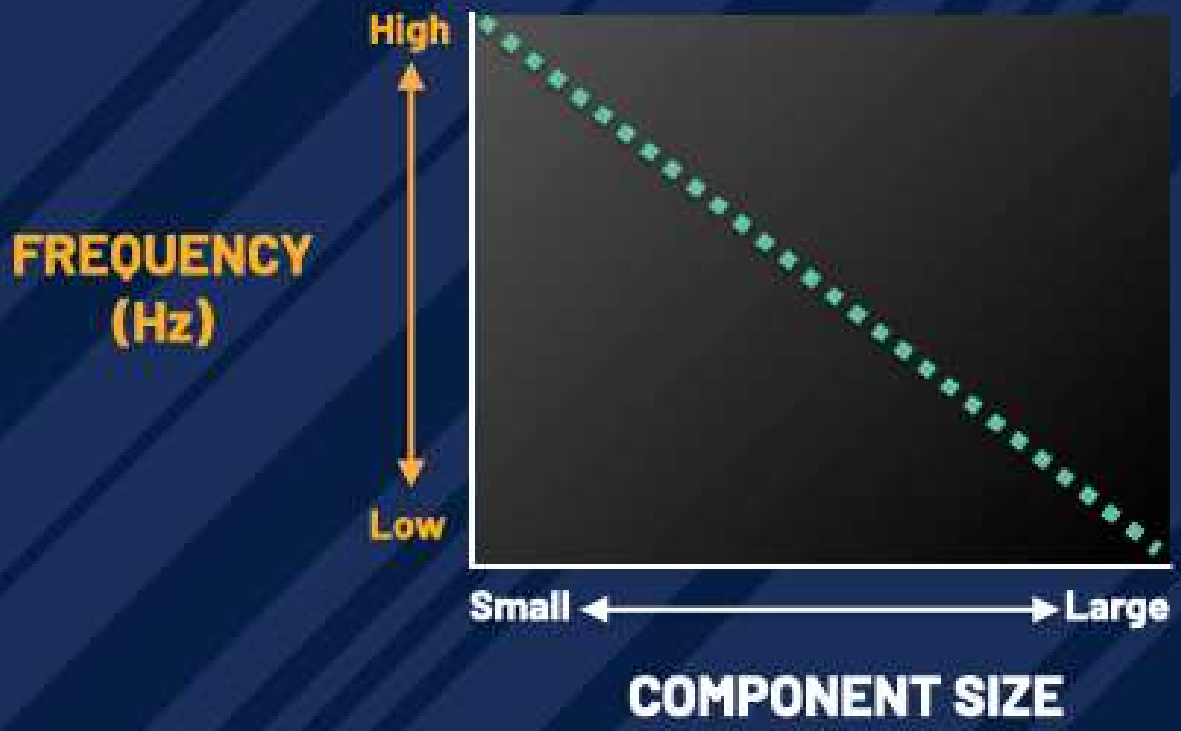
1 of 8: Provide audio feedback at EVERY opportunity.

https://thinkingpathwayz.weebly.com/10-mindframes-visible-learning.html

Guiding Principle 2 of 8

SFX should match the SIZE of the object and LENGTH of the action.

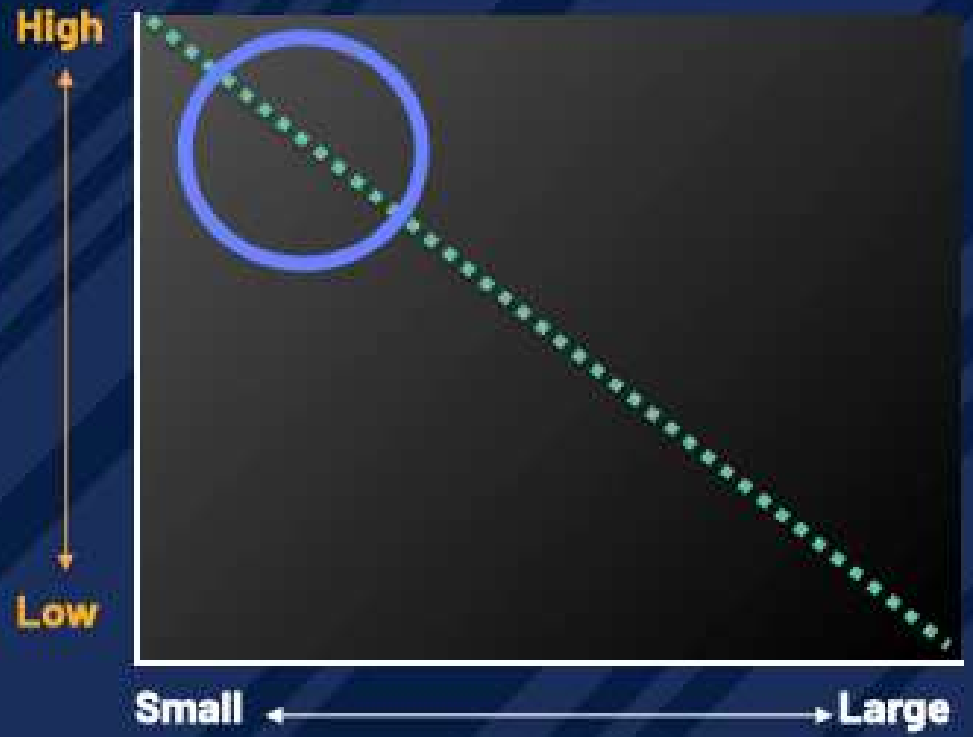
Frequency (Hz) Vs. Component Size



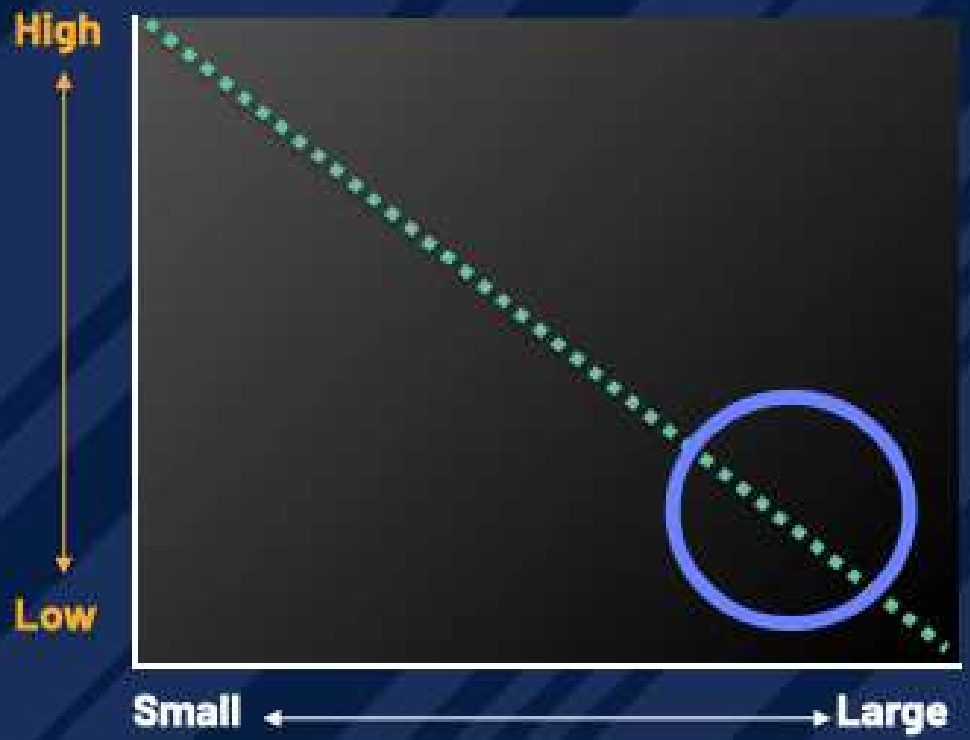
Frequency (Hz) Vs. Component Size







Frequency (Hz) Vs. Component Size





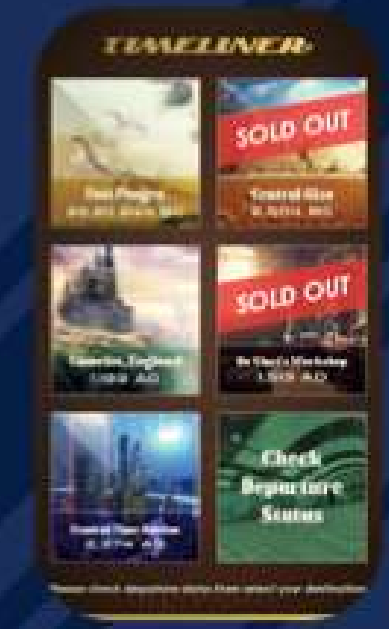


2 of 8: SFX should match the SIZE of the object and LENGTH of the action.

INSTANT (<1 sec)
Ex. Repeated Button Press



Timeliner
Vending Machine



MOMENT (1-3 sec)

Ex. Repetitive Motion (non-button)

Timeliner

Preview Portal



SEQUENCE (3+ sec)

Ex. Large Mechanism/Cinematic Event



The Depths

Krakenator

Guiding Principle 3 of 8

SFX can (and should) be MORE THAN ONE sound!

Layer SFX together for complexity/realism

- Think about ADSR
  - Attack
  - Decay
  - Sustain
  - Release



RUINS

Snack Ring Stack





Guiding Principle 4 of 8

Sound does not need to be LITERAL.



4 of 8: Sound does not need to be LITERAL.

Credit: Josh Harmon ("josh.harmon" on Instagram)

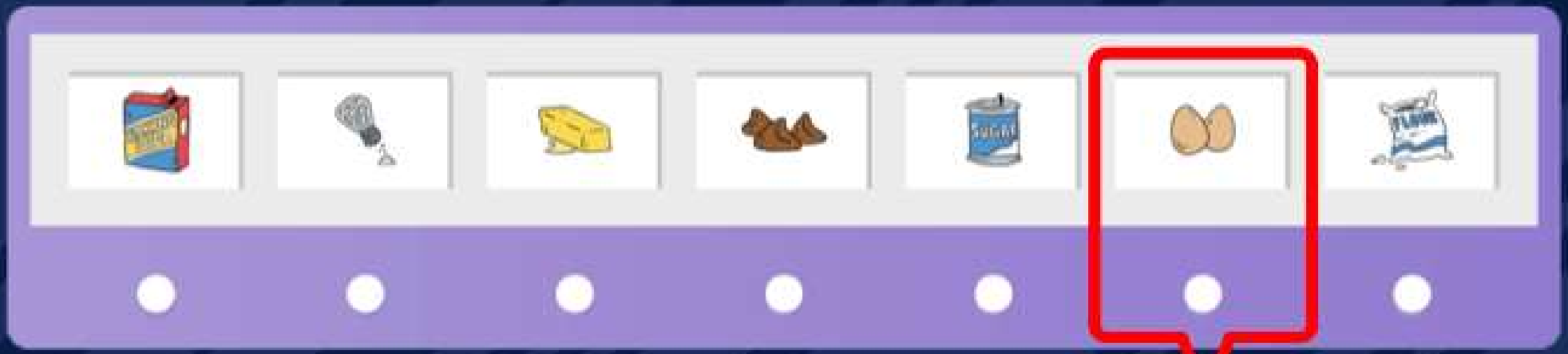
Think about Sound DIFFERENTLY



Rugrats: Search for the Losted Toys

Recipe Box

Think about Sound DIFFERENTLY



Frying Bacon

Buttons dropped on counter

Chicken

Guiding Principle 5 of 8

MOOD is KING

Players won't LISTEN but they will HEAR!

MOOD ADJECTIVES

- Define 3-5 adjectives for each game area
- The Depths:
  - Submarine:

    Bright, Hopeful, Aquatic



MOOD ADJECTIVES

- Define 3-5 adjectives for each game area
- The Depths:
  - Submarine:

    Bright, Hopeful, Aquatic
  - Sea Lab:

    Clever, Curious, Scientific



DO NOT GIVE MUSICAL ADVICE
(unless you are a musician)

"Think about how you want things to FEEL not necessarily how you want things to BE."
– Adam Savage

Guiding Principle 6 of 8

Add AMBIENCE to your music.

Ambience + Music = Deeper Immersion



Dripping Water + Guard Dogs + Rats + Bassline =

PRISON BREAK UTILITY HALL

PRESHOW MUSIC/SFX



Great Big Game Show

Studio Preparing for Broadcast

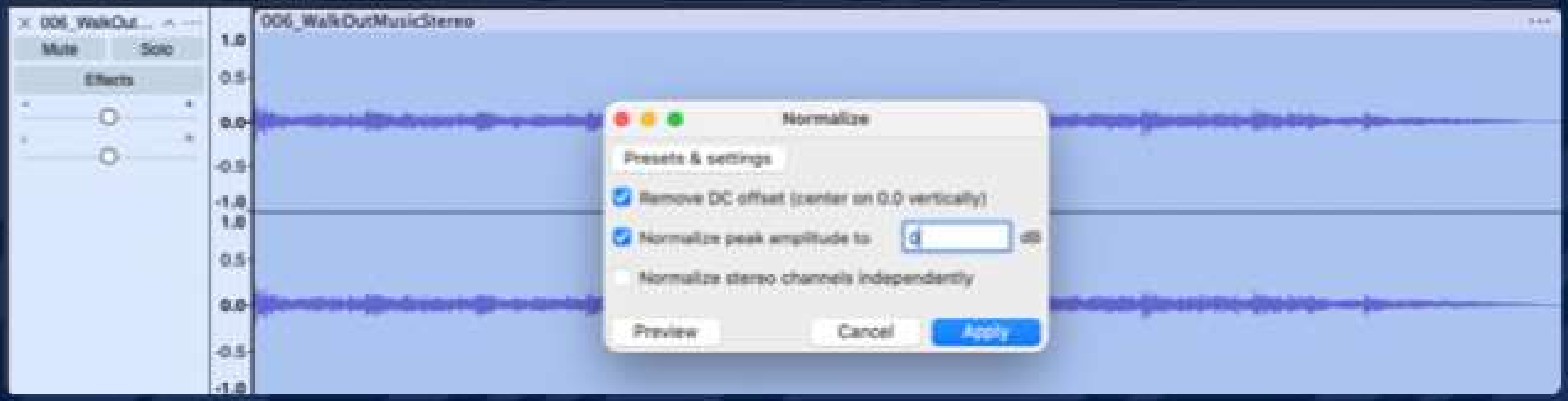
Guiding Principle 7 of 8

Avoid common mixing MISTAKES.

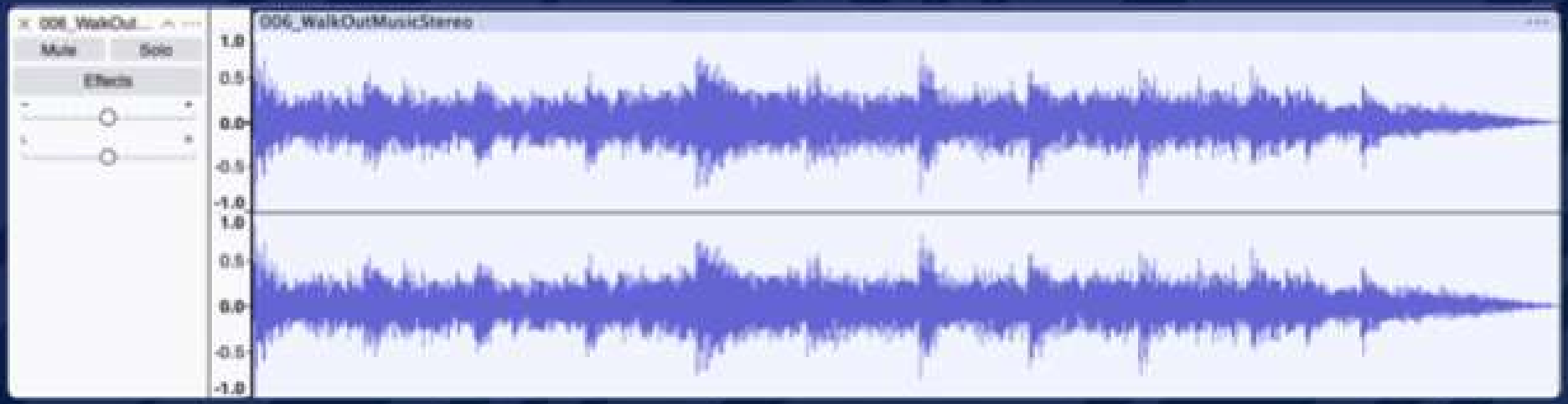
NORMALIZING



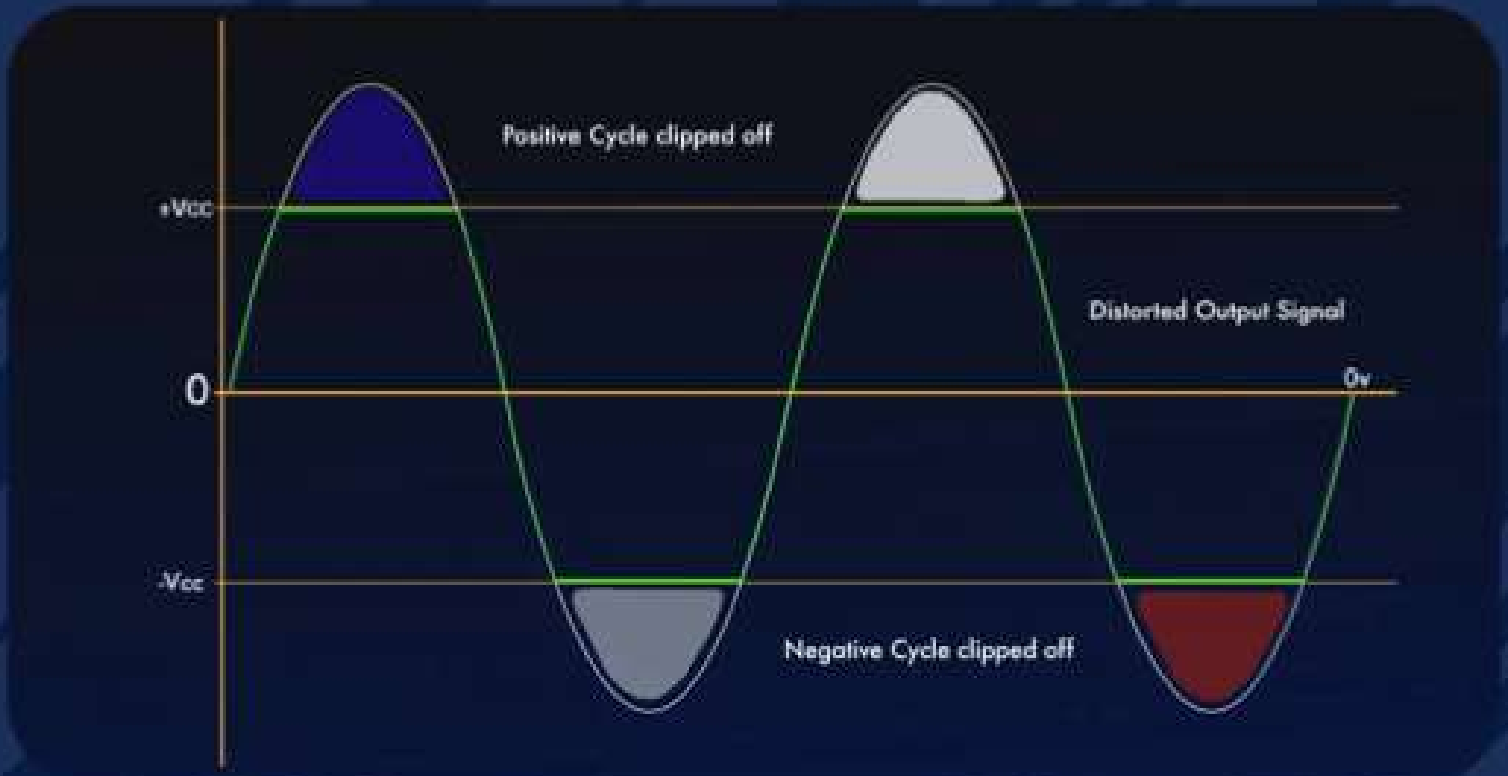
NORMALIZING



NORMALIZING



CLIPPING


Positive Cycle clipped off
+Vcc
Distorted Output Signal
0
0v
-Vcc
Negative Cycle clipped off

CLIPPING

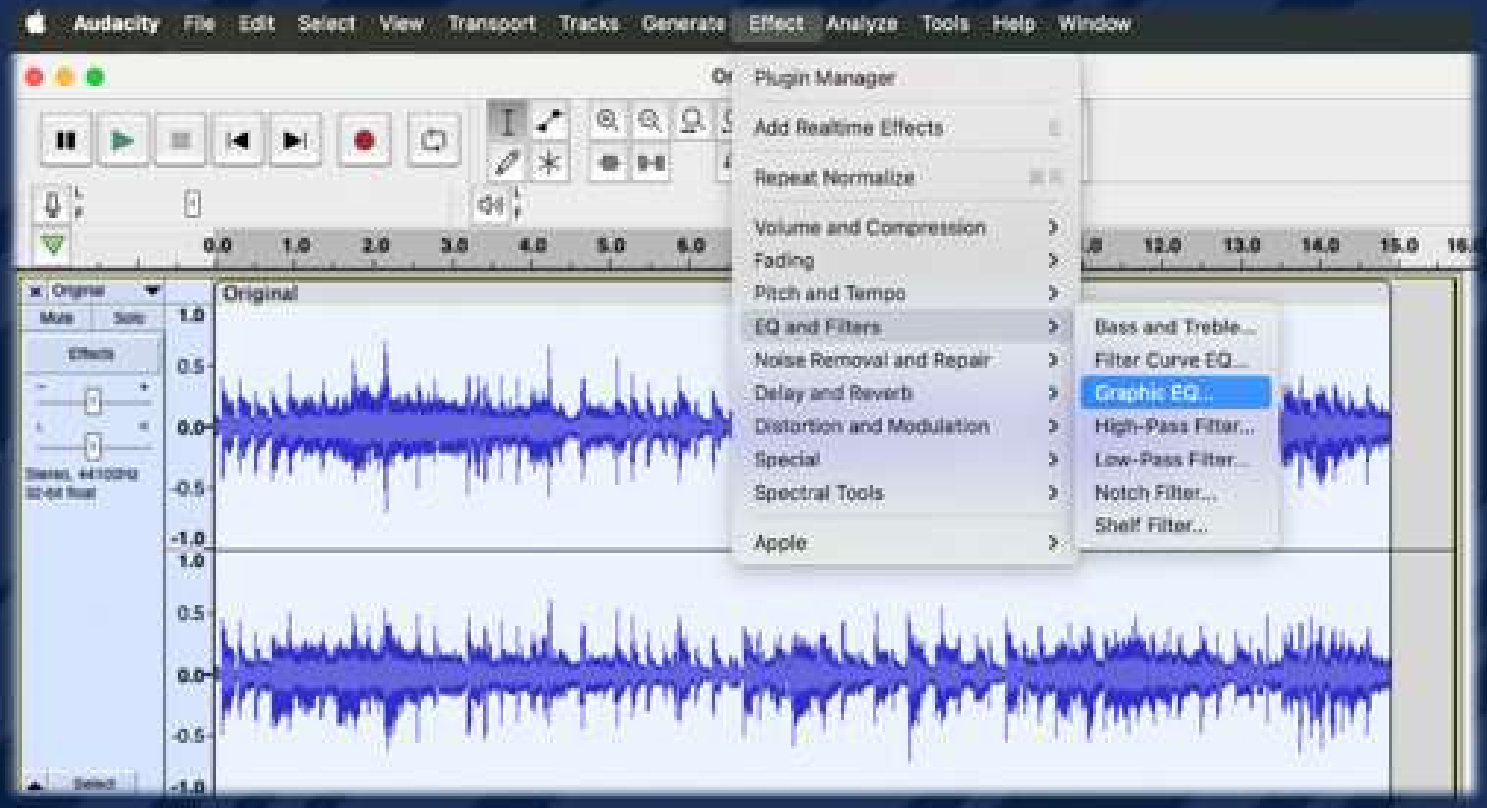


https://ilovemusic.in/blog/what-is-audio-clipping/

EQ


Audacity File Edit Select View Transport Tracks Generate Effect Analyze Tools Help Window
Original
Audio Setup
Share Audio
Original

EQ


Audacity
File
Edit
Select
View
Transport
Tracks
Generate
Effect
Analyze
Tools
Help
Window
Plugin Manager
Add Realtime Effects
Repeat Normalize
Volume and Compression
Fading
Pitch and Tempo
EQ and Filters
Noise Removal and Repair
Delay and Reverb
Distortion and Modulation
Special
Spectral Tools
Apple
Bass and Treble...
Filter Curve EQ...
Graphic EQ...
High-Pass Filter...
Low-Pass Filter...
Notch Filter...
Shelf Filter...
Original

EQ


Audacity File Edit Select View Transport Tracks Generate Effect Analyze Tools Help Window
Original
Graphic EQ
Presets & settings
Preview
Apply
20 25 31 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1k 1.25k 1.6k 2k 2.5k 3.15k 4k 5k 6.3k 8k 10k 12.5k 16k 20k
Turn down frequencies from 300-3000Hz
Flatten
Invert

EQ


Audacity File Edit Select View Transport Tracks Generate Effect Analyze Tools Help Window
Original
Audio Setup
Share Audio
Original

Guiding Principle 8 of 8

Accessibility is KINDNESS.

ALTERNATE SOUND MODES



YETI CAT MODE



VOLUME CONTROL

- Check your game's audio levels
  - $25 Decibel meter from Amazon
  - Phone Apps <$5

Have a way to EASILY turn down your volume in your games!

How hearing loss occurs.



How can I start?

- **SFX Libraries**
  - **Free**
    - 99 Sounds
    - Freesound
    - SoundBible
    - Zapsplat
  - **Paid**
    - Epidemic Sound – $49 for commercial license
    - Soundly - $15/month
    - Soundsnap - $25/month

Programs to Create/Modify Sound

- **Free**
  - Audacity
  - GarageBand
  - Soundly
  - Audio Director
  - WavePad
- **Professional/Paid**
  - Logic - *$199*
  - Reaper - *$225 License*
  - Ableton - *$99 - Intro*
  - ProTools - *$99 - Artist*
  - Adobe Audition - *$22.99/month*
  - Cubase - *$99 - Entry*











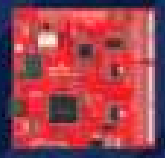






Audio Hardware

1. Audio Playback Device
Game Computer or
Tsunami Board - *$99*



2. Mixer
Behringer Eurorack
Pro RX1202FX — *$219*



3. Amplifier
Behringer EPQ304 - *$229*
Not necessary if speakers are "Active"



4. Speakers
JBL Control 25-1 Indoor/Outdoor - *$455*



Subwoofer
PreSonus Eris Sub 8BT - *$209*



Thank you!