foundry10

TEACHING DIGITAL AUDIO PRODUCTION BASICS

CURRICULUM FOR K-12 EDUCATORS

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Introduction

Course Description

In this course, you will learn the basics of digital audio production. You will use BandLab, an online DAW (digital audio workstation) to complete and return your work. Before the course, please go to www.bandlab.com and create a free account.

Learning Objectives

» Build technical skills with audio equipment and software

» Use audio production tools as a medium for self-expression

Expected Outcomes

» Students will be able to demonstrate mastery of basic audio production tools, techniques, and vocabulary

» Students will create their own original audio pieces in formats of their choice (i.e. music, podcast, sound design, etc.)

» Students will share their work with peers and family as part of a culminating showcase at the end of the semester

Grading Rubric (optional)

0	I did not attempt the lesson.
5	I demonstrated *one* technical skill taught in the lesson.
10	I demonstrated *some* of the technical skills taught in the lesson.
15	I demonstrated *most* of the technical skills taught in the lesson.
20	I demonstrated *all* of the technical skills taught in the lesson.

Curriculum

There are a total of 11 lessons and assignments for this course. The first 6 lessons cover the technical skills you will need to create music-based and dialogue-based audio. The final 3 assignments will be open-ended opportunities to choose the type of audio you are interested in creating. Lessons 07 and 08 will overlap with Assignments 01 and 02. These lessons on mixing and mastering audio will be based on what type of project you're working on, and will help you put a final polish on your audio.

	Lesson/Assignment Title	Week	Points	Last Day to Turn In
Lesson 01	Overview of Mix Editor	1	20	End of week 9
Lesson 02	Create Music with MIDI	2-3	20	End of week 9
Lesson 03	Effects and Automation Basics	4	20	End of week 9
Lesson 04A	How to Record Audio	5-6	20	End of week 9
Lesson 04B	Announce Yourself: Demo Reel	5-6	20	End of week 9
Lesson 05	All About Me Podcast	7	20	End of week 9
Lesson 06A	Find the Hook	8-9	20	End of week 18
Lesson 06B	Building a Hook	8-9	20	End of week 18
Assignment 01	Open-ended Project 01	10-12	80	End of week 18
Lesson 07	Creating Original FX	11	20	End of week 18
Assignment 02	Open-ended Project 02	13-15	80	End of week 18
Lesson 08A	Mixing and Mastering Music	14	20	End of week 18
Lesson 08B	Mixing and Mastering Dialogue	14	20	End of week 18
Assignment 03	Open-ended Project 03	16-18	80	End of week 18

Overview of Mix Editor and Creating Music with Premade Loops

Objective

In this lesson, you will get comfortable with BandLab's Mix Editor interface, and create a song using only premade loops. BandLab is an online **DAW (digital audio workstation).** A DAW is a software program used to create and edit audio or music. There are many DAWs out there, but they all have the same basic functions and controls. Once you learn about one DAW, you'll have an easier time learning about another.

Outcomes

Students will have created **4-8 bars** of music with at least **4 tracks (ex. Drums, Melody, Bass, Chords)** using premade loops.

Students will gain comfort and confidence in navigating BandLab's Mix Editor interface to Stop/Start audio, drag and drop loops, change the key, tempo, or time signature of their music, and operate the metronome.

Saving and Submitting Your Work

The **Save** and **Submit** buttons are at the top right corner of the Mix Editor. Be sure to save your work frequently! Every time you work out a new element to your song that you want to keep, click the **Save** button. When you are ready to turn your work in, use the **Submit** button.

## Set Up Your Session

» If you haven't already, go to bandlab.com and create a free account.

» Follow the question prompts (make the best choices that work for you).

» Once completed, you will land on the live feed page. This page is where you will see the latest news, updates from followers, your latest projects, and more.

» Click on the red **Create** button at the top right to start a new project.

Browse Loops

When you first open your session, you will see the following options. Choose to **BandLab Sounds**.
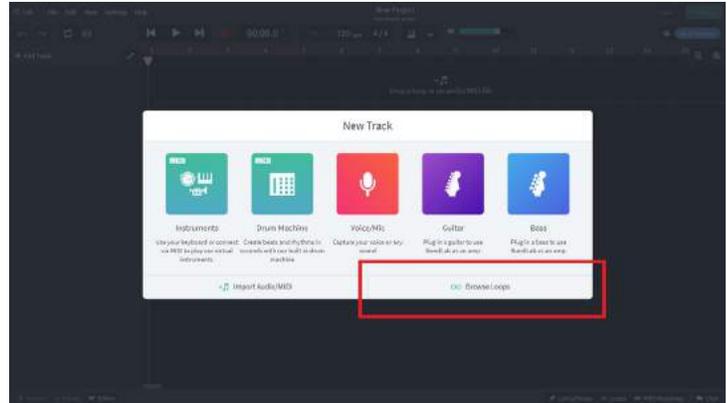
This will open up the **Loops Menu.** You can navigate to the Loops Menu by clicking the Loops button in the bottom right of your screen. You can also hide this menu by clicking on the Loops button again.
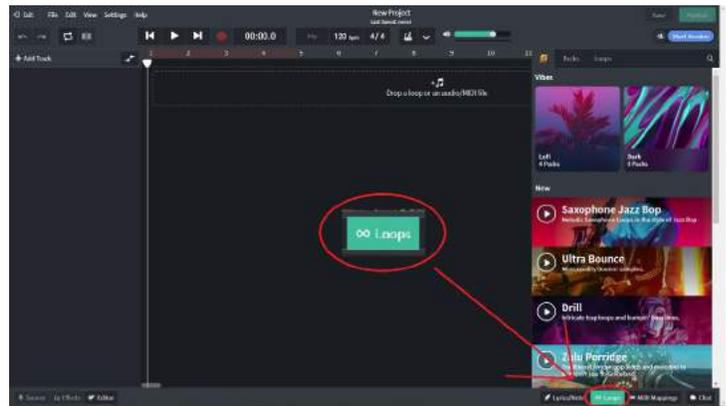
Choose a loop, and then drag and drop it into the dotted area towards the top of the screen that reads **"Drop a loop or an audio/MIDI file."** This will create a new **audio track** and place your loop on that track for you. You can also create audio tracks by clicking on the **+Add Track** button in the top left of your screen, and then add loops to the new track.
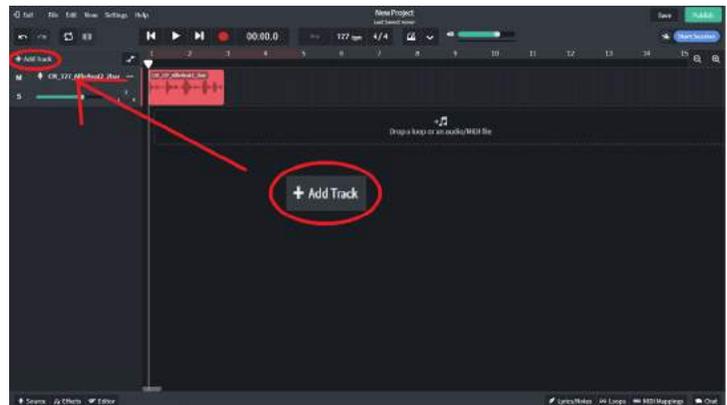
Continue browsing and adding loops to create a song of your own. You can use loops all from one loop pack, or mix and match — there's no wrong answer here! Take a look at the example below**.** You can also add **FX loops** as **transition elements** in your song.

Don't Forget! As you create, here are some tools you can use to navigate the DAW.

The **Undo and Redo buttons** allow you to undo or redo your most recent actions.

The **Cycle** button will loop a section of your song when it's active.
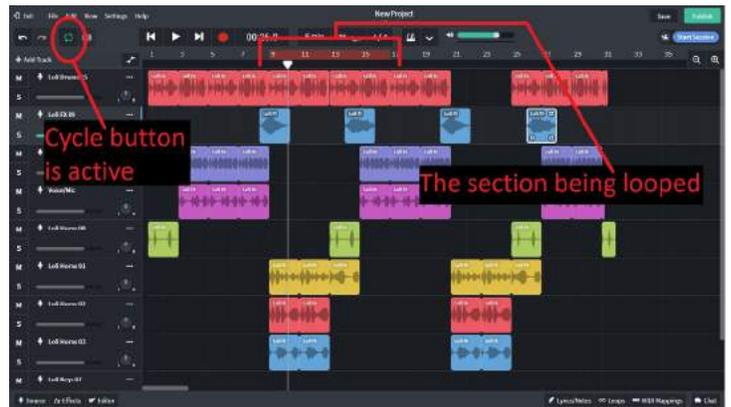
Next, let's look at the **transport** and the **playhead**. The **playhead** is the vertical line with a triangle on top that moves across the screen as your song plays. It gives you a visual indication of where you are in the song. The playhead can be controlled by the transport. The **transport** is the collection of the back, play, forward, and record buttons, and the time indicator. The time indicator can be set to **minutes and seconds**, or **beats and measures** by clicking on it and selecting your preference from the drop down menu.

You can also change the **key, tempo,** and **time signature** of your song at any time. These controls are located in the top center of the Mix Editor.

The **metronome** clicks once for every beat to help you keep your loops on rhythm and sound like they go together. You adjust your metronome settings using the drop down menu next to the metronome button. Since we're working with only pre-made loops in this lesson the metronome isn't necessary, but it will be very helpful when we create our own original loops in the next lesson.
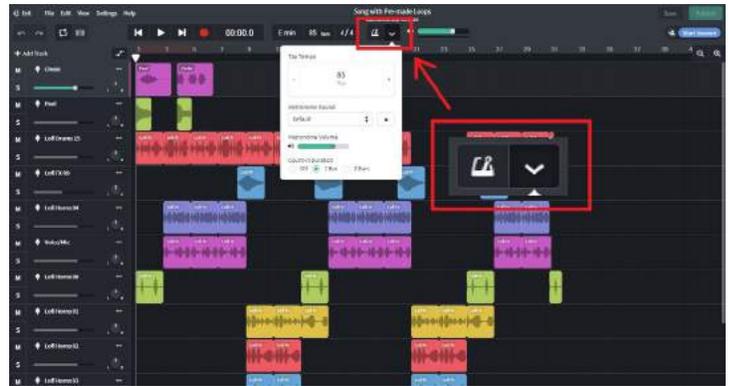
Final Thoughts

Pre-made loops are a great way to get started using audio tools and gather musical inspiration. Feel free to explore and experiment further!

Examples:

Just Loops — Frank Walton

Glitch Loop — Chelsi Gorzelsky

Remember! Make sure to save your work frequently!

Create Music with MIDI

Objective

In this lesson you will create completely original drum beats in a style of your choice using BandLab's Instrument devices. Once you've tried it out with some drums, you can experiment with the melody instruments!

Outcome

» Students will have created original MIDI loops on the timeline using multiple tracks to separate specific drum parts.

» Students will understand how to use their computer keyboard input to program patterns and their mouse to write in notes when needed.

Instructions

Open a new project in BandLab and **choose the instrument option** in the track menu. A Piano will load up as the default instrument.

Locate the **instrument options** at the bottom left of the screen and select your choice of sound. *I'm using the Creator Kits category for this example.*

In the next drop down box, **select the type of kit** or soundset that compliments the sound you're going for.
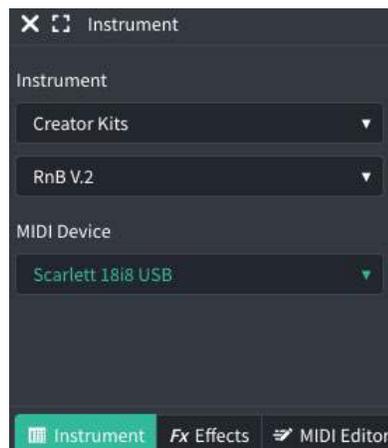
Notice how each sound corresponds to the keys on your keyboard.

Take your time to get used to the setup and **play around with different combinations until you find a nice pattern. Try playing only 1-2 sounds at a time** to create a pattern. You can always layer more sounds later or on separate tracks.

Set your tempo at the top of the Mix Editor and turn on the metronome with the **key command (*M*).** There's also a drop down menu next to the metronome on off button to adjust parameters and count in options.
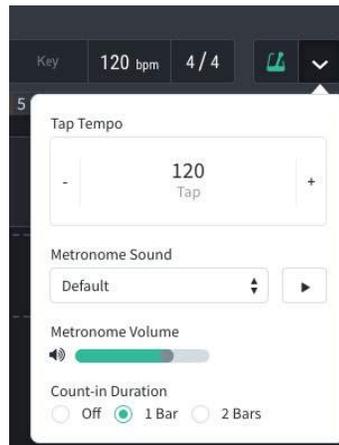
Press the spacebar and practice your pattern to be recorded. Once you're ready to record, **press (*R*) or the record button (*red circle*)** and the one bar countoff will start.
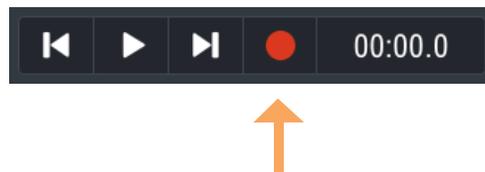
After the one bar count, **begin to record your pattern** until you reach bar 5 in the arrangement window.

Turn on the **cycle** with **key command (*C*)** and press **spacebar** to playback your loop. Make sure the pattern is playing back correctly. If not, you can always delete and record again until you find a take you like.

Another option to edit MIDI is to double-click on the recorded region and **edit notes manually with the MIDI editor.** The MIDI editor will open up at the bottom of the Mix Editor and show your recorded notes.

Left: Move tool
Middle: Draw tool
Right: Velocity
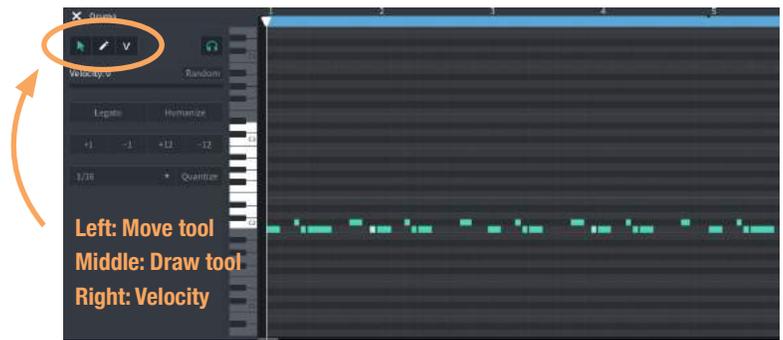
You can move around notes with the selected option show *(hold control to drag smoothly)*. The middle *(draw)* tool will let you manually draw in notes by double-clicking and the right tool is for velocity control *(how loud or soft each note is)*.

If you find yourself getting out of time with the metronome during recording, turn on the quantize option just above the instrument grid. When recording, your hits will line up to the closest grid marker making a tighter recording.

Add at least 2 more tracks until you have a cohesive song idea with only recorded MIDI. Name your tracks to keep them organized by clicking on their names. You can add loops to your song if you want to, but only after you've recorded a minimum of 3 tracks with your own MIDI events.

Remember! Make sure to give your session a name and save your work frequently!

Effects Basics

Objective

Audio effects are essentially hardware or software devices that control how an audio signal is heard. Effects have various controls and parameters and are useful as studio tools while mixing or recording music. Use effects on your tracks to open up a whole new world of possibilities for your music and audio.

Outcome

» Students will understand how to add audio effects in Bandlab to tracks using either presets or individual devices.

» Students will explore the functions of highly used audio processors such as the equalizer, compressor, and reverb.

» Students will apply these basic effects to their own work in artistically thoughtful ways.

Overview

There are three effects that are used most commonly on all types of audio. These effects are **Equalization (EQ), Dynamic Range Compression (Compression) and Reverberation (Reverb) .** From music to sound design to live DJ'ing, podcasting, and more — you name it, they're probably using effects to improve the quality of their finished products.

Equalization

Put very simply, EQ is a tool used to control the volumes of different frequencies (pitches) in a sound. A typical 3-band EQ has individual volume controls for the low, middle, and high frequencies in a sound. More complex EQ tools separate frequencies into even narrower ranges, sometimes using 7 or 8 different ranges to represent the full frequency spectrum (Sub bass, low, lower middle, upper middle, high, and high air). EQing is like sculpting: it shapes the existing frequencies of your sound. By cutting or boosting certain frequencies, EQ shapes the tone and character of your sound. EQing also changes the balance between the frequencies that are already there.

Compression

Compression is the reduction of dynamic range—the difference between the loudest and quietest parts of an audio signal. When compression is applied, the quieter parts of the signal are boosted and the louder ones are attenuated. Compression is often used to 'glue things together' in the mix. It has a quality to it that will help make different sounds blend together better, control the dynamic range of volumes, and tricks our brains into believing that everything being compressed is just a little louder and more clear.

Reverb

Reverb is short for reverberation. Reverb happens daily, but we don't always notice it. Reverb is a bunch of echoes all happening at the same time, so you hear them as one single effect: reverb. There's different kinds of reverb in many types of spaces. The most obvious examples of reverberant spaces are tunnels, cathedrals, halls and caves.

Instructions

Navigate to bandlab.com and open one of your previous projects. We'll use this project to experiment with equalization, compression, and reverb!

In order to add effects, you will need to open the **FX Effects** window at the bottom left of the user interface.
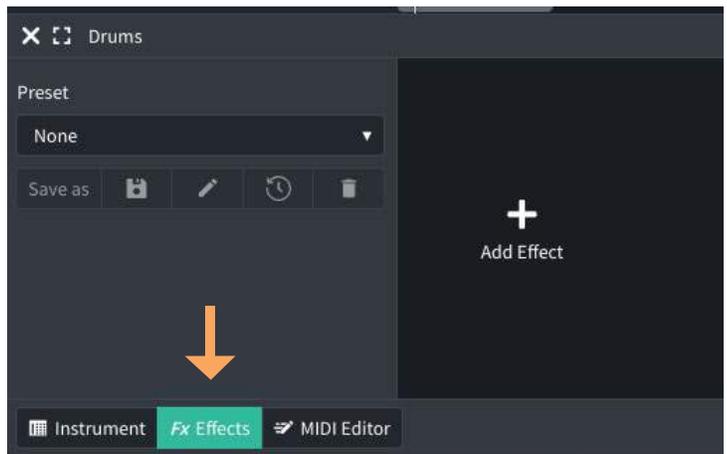
You will see a **preset** option box which will allow you to add a variety of preset effects groupings. There is also an **+Add Effect option** to add single (or a combination) of different effects to your track. Using presets are a great way to get you started for certain tracks, as they give you a more professional start in sculpting a certain sound. While they sometimes work as a "set it and forget it" option, many times they need to be edited to fit the exact sound you're going for.

For example, highlight the drum track then select the preset option Warm Tube, the following preset effects will load.

This particular preset loaded a **driver, compressor, and a graphic EQ** plugin.

You can turn off individual plugins using the green on/off icon and also choose to delete them with the "x" icon here:

Remember! *Preset options change depending on the track you've chosen so take the time to explore and see what you like!!

For this lesson, we will focus mainly on the **EQ, compressor** and **reverb** effects.

To add each of these effects to an individual track, click the **+Add Effect** option and choose from these categories: *Tone (EQ), Dynamics (Compression), or Reverb*
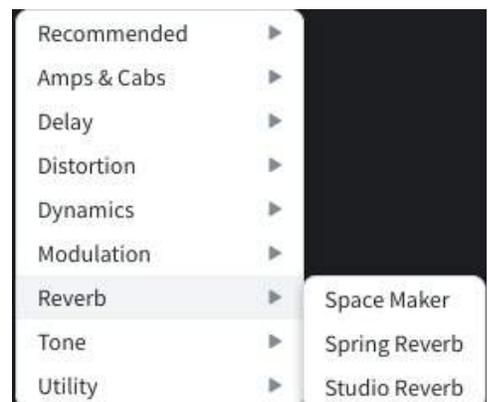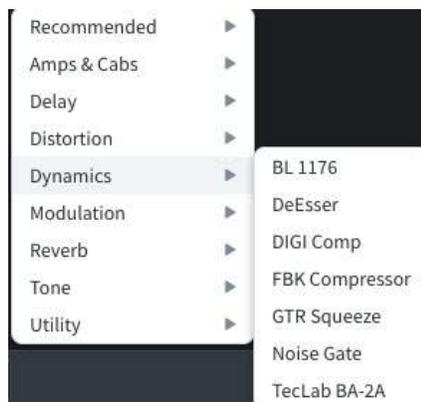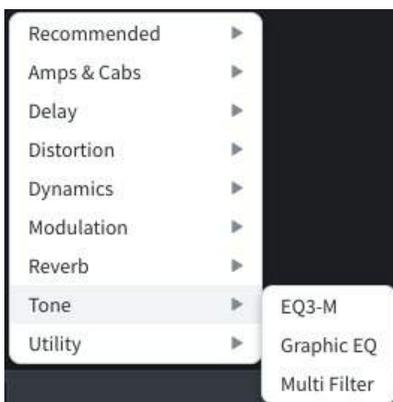
Explore these options on different tracks and adjust the parameters. Listen to what happens to the audio as you experiment.

Use effects on at least 3 of the tracks and focus on making things sound different than what was previously recorded. If you would like to try different effects, feel free to experiment further.

Additional Resources

https://patches.zone/compression-guide

Effects Basics — Frank Walton

Remember! Make sure to save your work frequently!

Recording Audio in BandLab

Overview

Digital audio has two main types of tracks - MIDI tracks and audio tracks. Audio tracks are used to record real life sounds through a microphone, like a voice, guitar, found sounds - whatever you like!

Objective

Understand how to successfully record audio tracks in Bandlab using the built in microphone, USB mic or audio interface. Gain a basic understanding of what causes feedback, how to check your input level and basic techniques for recording audio successfully.

Outcomes

» Students will demonstrate their understanding of recording audio in BandLab

» Stuwdents will gain an understanding of feedback and how to avoid it

» Students will demonstrate basic gain staging and microphone techniques

Instructions

Create a new project in Bandlab. When asked to create a new track, choose "Voice/Mic". This will create an audio track.
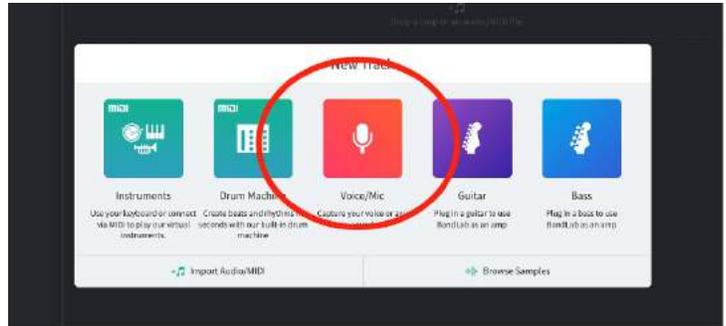
On the bottom right of the device choose the correct input for your track. You can choose your built-in computer mic, a USB mic or an audio interface. **Remember: Input means where your sound is coming from.**
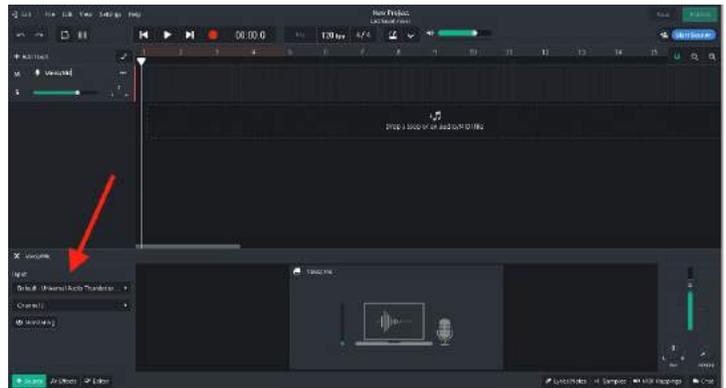
After you have chosen the input you may choose to record without monitoring (hearing) yourself, or you can take steps to be able to hear yourself as you record. To monitor yourself, **make sure you plug in your headphones first!** If you don't, you'll get stuck in a feedback loop.

What is feedback?

If you speak into your microphone, the signal (sound) travels through the microphone into your computer. With headphones on, the sound will travel out of your computer and into your ears, ending the signal path. However, if you don't have your headphones on, the sound goes into your computer and also goes out of the speakers, into the room and is picked up by your microphone again. Then it is re-inputted into the computer, which then hears it from the speakers again, and the signal is amplified over and over again causing a very loud noise. We call this a feedback loop. This is why we use headphones to monitor ourselves. If you forget and your system starts to feed back, make sure you hit the "monitor" button again to turn monitoring off and the sound should stop immediately.

2. Sound system amplifies sound, sends to speakers

1. Microphone picks up sound which goes to sound system

3. Speakers reproduce sound, which is picked up by microphone

If you have your headphones on and monitoring is enabled you should be able to hear yourself talk. You may notice a slight delay between when you talk and when the sound is played through your headphones. We call this latency.

What is latency?

Latency is the processing time it takes for your computer to hear your sound, convert it and send it back through the speakers for you to hear. Usually it is not noticeable (low latency) but sometimes it is noticeable and needs to be corrected. Bandlab has a latency test that you can use if you feel like you are experiencing your audio recordings being out of sync with the rest of your track. Under "Settings" at the top left of the screen, click "Latency Test" and follow instructions. Bandlab will then employ "delay compensation" to fix the latency and it should sound much better!

Input → Output

The time in between...

Latency
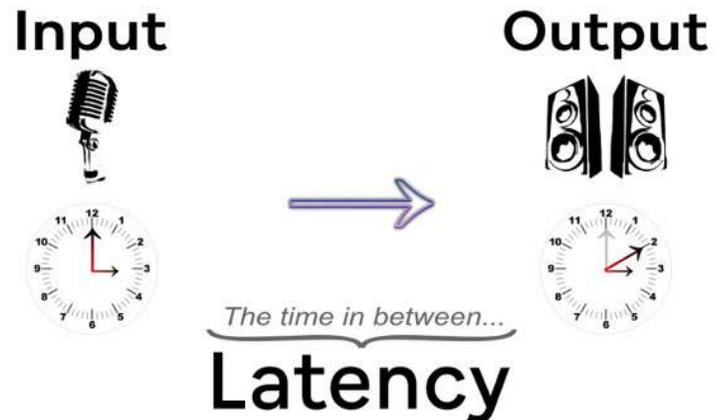
Other recording concerns:

Your microphone is capable of picking up all the different sounds in your environment so try to record in a quiet space if you're looking for cleaner vocals. You can even use soft materials like foam or egg cartons to "deaden" the space you're in and make it sound "dryer" or more professional. Try recording in a closet - the clothes absorb the excess noise!

Voice/Mic

Too Loud (clipping!)

Voice/Mic
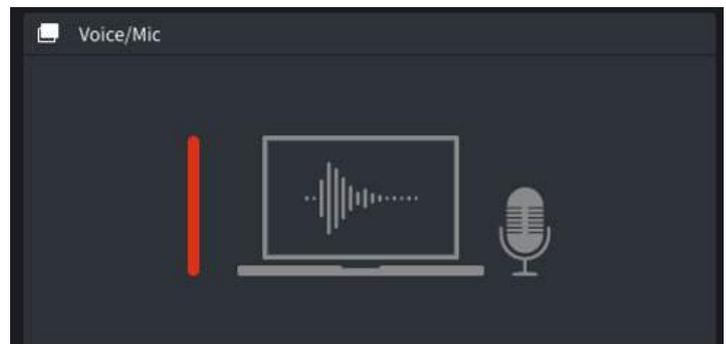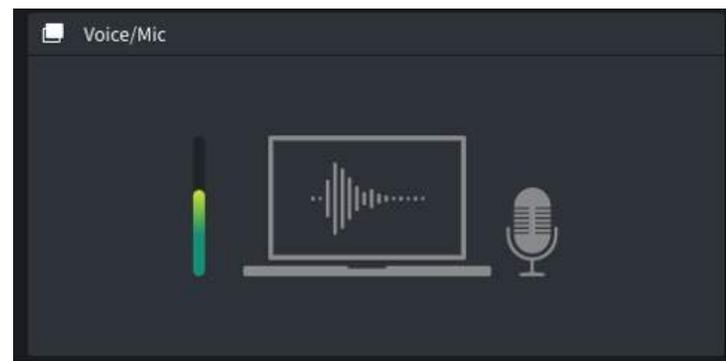
Healthy Signal

You also want to make sure you're not too close to the mic, since that can cause your audio to **"clip"** and sound distorted. On your audio track you should see an input meter - this will let you know if you have too much signal coming in (you're too loud!) or if you don't have enough signal (too quiet!). You want to shoot for a nice healthy green color with a bit of yellow at the top. If you see red, try backing away from the mic a bit or speaking more softly.

Once you're ready to record, make sure your track is selected and then hit the red record button at the top of the project. **Record a short greeting.**

When you stop recording you can see your waveform. Play it back and see how it sounds!

    a. The audio has recorded to the track

    b. The audio is not clipping and is loud enough to hear

    c. I have a clear recording of my voice without much background noise

Keep trying until you meet these goals!

BandLab has a great tutorial on recording audio here:

https://blog.bandlab.com/how-to-record-vocals-on-your-phone/

Announce Yourself: Demo Reel

Objective

So far in class, you have created 3 pieces of music; let's make demo reels! A demo reel is a snapshot of your audio work. It showcases your style and talents for prospective collaborators to get an idea of what you and your music is about. Creating a demo reel is not only easy, but it's fun! We've already done the hard work of generating our music, and now we get to put it into a portfolio to share with others.

Outcome

» Students will create a short demo reel of their musical projects thus far in class.

Instructions

First, download .WAV files for each of your songs in BandLab

    a.   Open your song in Mix Editor

    b.   Make sure there are no clips highlighted (if so, click your mouse in an open area)

    c.   Go to File > Download > Mixdown As (we will use the tracks option when exporting separate files)

    d.   A dialogue box will appear similar to the one on the right

    e.   Select HD WAV option

    f.   The file will be sent to your downloads folder

    g.   After downloading the track, rename the file with your song name.

Download

Format

Medium Quality MP3
128kbps, 44.1kHz - Lightweight, heavily compressed file. Great for sharing.

High Quality MP3
192kbps, 44.1kHz - Lightweight, good quality. Optimized for streaming.

Highest Quality MP3
320kbps, 44.1kHz - Great sound, while still lightweight.

WAV
16bit, 44.1kHz - No compression. Amazing sound. Larger file.

HD WAV
24bit, 44.1kHz - When all you care about is quality.

[Download]

Open a new project in Mix Editor.

Drag and drop each of your songs onto their own tracks.

Add a Voice/Mic track.

Record yourself introducing each of your songs and signing off at the end of your reel. Here are some sample scripts you can use if you would like to:

    a.   Hi, my name is _____ and you're about to listen to my song _____. Enjoy!

    b.   That was my track _____ you just heard. Next up is _____.

    c.   Thank you so much for listening!

Sit back and take a moment to enjoy your creation. :)

Remember! Make sure to save your work frequently!

All About Me Podcast

Objective

Podcasts are an artistic expression of information and ideas in an audio format. A podcast can be about anything - things you might expect like the news, weather, and talk shows can all be found in podcasts. But the format lends itself to sharing about much more than that. There are a lot of podcasts out there about almost anything you can imagine - food, music, true crime stories, fiction, fantasy, games, cars, arts, you name it! For this project, you will create a short 2-3 minute introductory podcast about yourself. Tell your listeners what you love and what is important to you!

Outcome

» Students will record a short 2-3 minute introductory podcast about themselves.

» Students will incorporate music and sound effects into their podcast episode.

Instructions

Write down or type the answers to these questions for your interview. If you want you can write down every word you want to say, or you can jot down a few notes for each item. What you write will be your script for recording, to help you remember what you want to say. If you are a person who likes to read word for word, write everything. If you like to be more conversational, just take notes so you remember everything you want to talk about.

   a.   Introduce yourself: What's your name? Where are you from? What school do you go to, and what grade are you in?

   b.   Who do you consider family, and why? (This, of course, includes pets)

   c.   What kinds of things do you do to connect with your friends and family?

   d.   What is one of your most important possessions? What's the story behind it and why is it important to you?

   e.   When you have spare time, how do you like to spend it?

   f.   What are you most proud of?

   g.   What do you wish your teachers (or others in general) knew about you?

Record your podcast using BandLab on your computer, phone, or mobile device. Use your script as a guide!

Edit your audio to remove awkward silences, extraneous sounds and noises, and 'umms and uhhhs' from your recorded audio.

Add intro and outro music, and use automation to mix those tracks with your speaking track.

Use EQ, compression, and reverb effects on your speaking track to bring out the best in your voice.

Download a .WAV file of your podcast in BandLab.

   a.   Open the song in Mix Editor

   b.   Choose File > Download > Mixdown As

   c.   Save your file to your computer to share with others later

Podcast Examples:

Stuff You Should Know; Song Exploder; Savor

Remember! Make sure to save your work frequently!

Find the Hook

Objective

What is one thing that the greatest songs, regardless of genre, all have in common? They have great hooks! A hook is the part of the song that draws you in and makes you want to keep listening. Often hooks are part of the chorus of a song, but not always. Sometimes hooks come right at the beginning - sometimes artists make their listeners wait until later in the song for the hook, but build it up along the way. In this lesson, you'll practice identifying hooks and expressing what it is about a good hook that keeps you listening!

Outcomes

» Students will successfully identify hooks in popular music.

» Students will identify and describe the components in the hook of each song they analyze, and discuss why that hook is effective or ineffective.

Instructions

Below is a link to the top 10 most popular songs of the last decade ranked by Billboard. A YouTube link is included. (you can also search for your own link as well)

https://www.billboard.com/charts/decade-end/hot-100

Your assignment is to identify and analyze the hooks in 5 songs of your choice. Use the charts on the following pages to guide you through the process.

Final Thoughts

A true chart-topper has got to have a strong hook that pulls the listener in and keeps them interested. Continue identifying hooks in your favorite songs and take time to notice what it is about them that keeps YOU interested. In our next lesson, we'll talk about building our own hooks and keeping a reference of your favorite hooks will go a long way to inspire your own music!

Artist	
Song/Album	
What is the main hook? *(e.g. lyrics)*	
Where is the hook? *(e.g. intro, chorus)*	
How effective or ineffective is the main hook and why? *(E.g. It's not very effective. It doesn't repeat enough or it's very effective because I'm still singing it days later)*	

Artist	
Song/Album	
What is the main hook? *(e.g. lyrics)*	
Where is the hook? *(e.g. intro, chorus)*	
How effective or ineffective is the main hook and why? *(E.g. It's not very effective. It doesn't repeat enough or it's very effective because I'm still singing it days later)*	

Artist	
Song/Album	
What is the main hook? *(e.g. lyrics)*	
Where is the hook? *(e.g. intro, chorus)*	
How effective or ineffective is the main hook and why? *(E.g. It's not very effective. It doesn't repeat enough or it's very effective because I'm still singing it days later)*	

Artist	
Song/Album	
What is the main hook? *(e.g. lyrics)*	
Where is the hook? *(e.g. intro, chorus)*	
How effective or ineffective is the main hook and why? *(E.g. It's not very effective. It doesn't repeat enough or it's very effective because I'm still singing it days later)*	

Artist	
Song/Album	
What is the main hook? *(e.g. lyrics)*	
Where is the hook? *(e.g. intro, chorus)*	
How effective or ineffective is the main hook and why? *(E.g. It's not very effective. It doesn't repeat enough or it's very effective because I'm still singing it days later)*	

Building a Hook

Objective

In part one of this lesson, you will listen actively to part of a song and replicate the drums, main melody, and bass of that song using MIDI. In part two, you will use the MIDI you created in this lesson to build your own original hook.

Introduction

One of the best ways to learn how to write music is to study the type of music you want to write. Look for inspiration in your favorite songs - what is it that you like about the song? How can you incorporate it into your own music?

Instructions

Choose one of the songs you studied in the *Find the Hook lesson.*

Go to **bandlab.com** and start a new project in the Mix Editor.

Upload your song sample into a track on the Mix Editor, and cut the sample down to only the first hook.

Create 3 new MIDI tracks and name them like this:

    a. Drums

    b. Bass

    c. Melody

        i. Choose a drum kit, creator kit, or MIDI percussion instrument that fits the style of your song sample (i.e., Hip Hop kit if you're doing a Hip Hop song, Rock kit if you're doing a Rock song, etc).

       ii. Leave your melody and bass tracks on the piano setting for now - this will make it easier to hear what you're doing. You can change the MIDI instrument later and choose a different sound for your bass and melody tracks.

Listen to your song sample and recreate the drums, bass, and main melody with MIDI. Here are some strategies to help you:

    a. Focus on one piece at a time, lay it out, then move on to the next piece.

    b. As you listen, try to play along with the song using your MIDI instruments or typing keyboard.

    c. Tap rhythms out on your desk with your hands, or try singing melodies and basslines out loud. This will help you keep the music solid in your head as you recreate it.

Change the instrument on your Bass and Melody tracks. Choose instruments and sounds that you like and that you think blend together well. Remember this is a cover - it doesn't have to sound exactly like the original!

Adding effects to your tracks is not required for this assignment, but it will definitely make it more fun! Try out EQ, Reverb, Compression, Delay, and anything else you find interesting.

When you are finished, submit your project in BandLab.

Remember! Make sure to save your work frequently!

Creating Original FX

Introduction

Sound effects (FX), which use the process of adding audio effects in most cases, are essentially a created or processed sound that enhances an artistic piece. Sound effects are used in nearly every piece of media that we enjoy such as music, movies, video games, live performances, and more. For example, this movie clip shows an actor running through the woods and snow crunching under their shoes. This sound effect was created using "Foley" to help build realism to the movie visual. Foley Artists are sound designers who use everyday objects to create sound effects. Watch this video, Wall-E Animation Foley and Sound Design, to see the Foley process in action!

Objective

In this lesson, you will learn how to build a basic reverse reverb effect using a combination of instruments and audio effects. Sound layering will also be part of your exploration, combining pre-recorded sounds and audio effects together to create new unique sounds.

Open the BandLab assignment and select Instruments as your new track option. The *Grand Piano* instrument will be loaded by default and we will use this instrument.

Record any MIDI note the length of one bar. Quantize the note if needed so it looks like the example shown here.

Navigate to the *FX* option at the bottom left of the interface, select add effect, Reverb, then Studio Reverb.
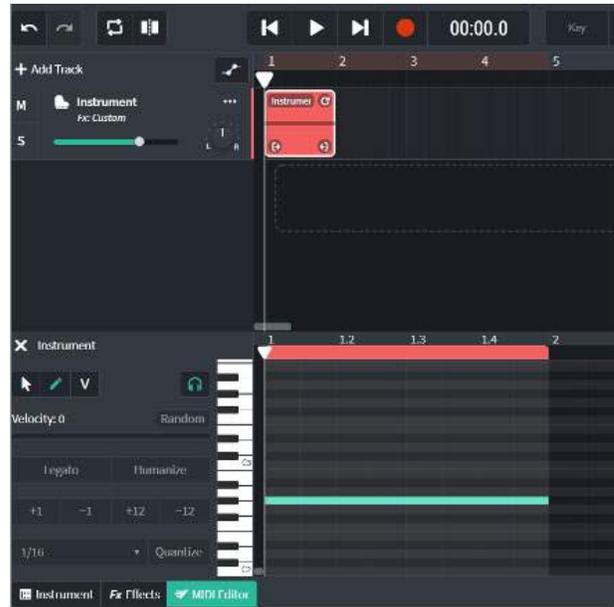
Turn the mix knob up on your reverb to about 9 so that most of the signal you hear will be from the reverb effect.

We'll need to convert this MIDI region into an audio file, but first we must extend the region so that the reverb gets recorded into the file. Extend the region to bar 5 by moving your mouse over the bottom right corner and dragging.
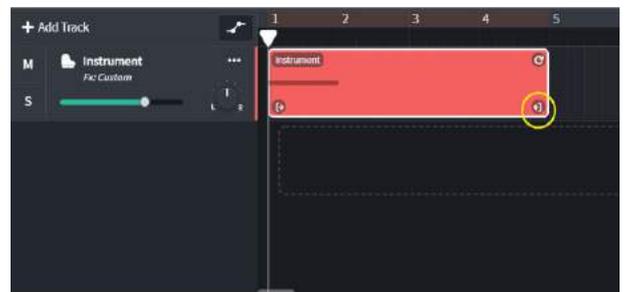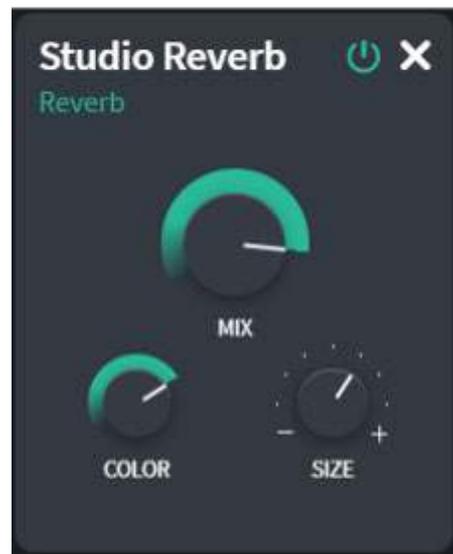
Go to FIle and select *Download* - Tracks. In the next dialog box select to download the instrument track (arrow pointing down just to the right).

Navigate to your saved file in your downloads folder. It will have a file name with numbers and letters, so take the time to rename the file to piano reverb.

Drag it into the BandLab arrangement view. Mute your original piano track and play back your recording. (the following display should resemble your session).
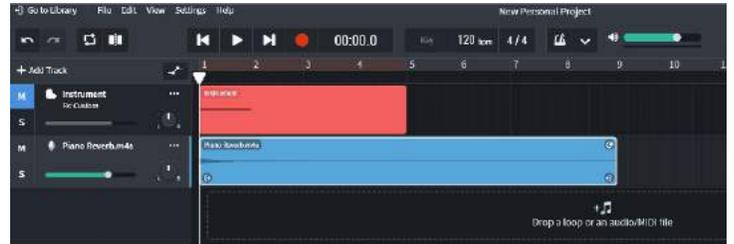
Now, we will reverse the audio file to hear the effect in action. Double click on the *Piano Reverb* region or select the *Editor* option at the bottom left of the BandLab interface. Click reverse. Your audio region should look as follows (you may need to zoom out to view the whole waveform).
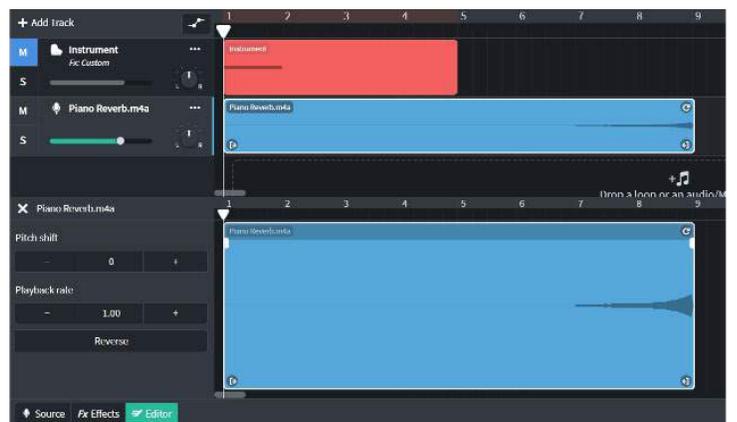
Play back the file. You will notice a fair amount of dead audio space before the effect is audible. To fix this, we will trim the file down to the spot where we hear the effect start.

Click and drag on the bottom left of the audio region and drag to the right until you find the spot where the reverb effect is audible. This may take a few times of playing back and editing
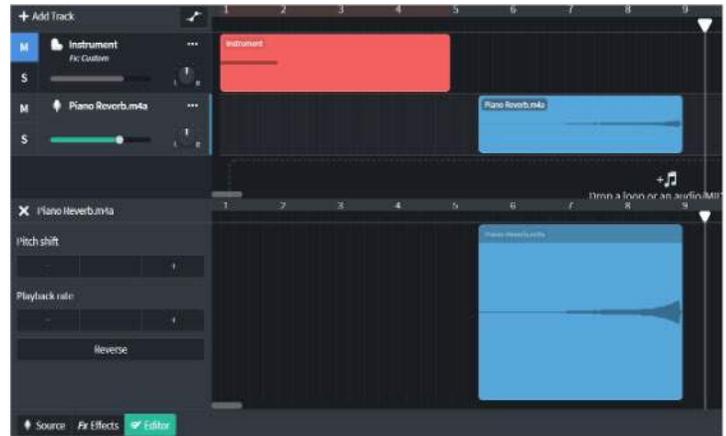
We now have an effect that could be used as a transition or intro effect for a song or visual. Let's go a bit further and layer some sounds together to create a bigger sounding effect.

Navigate to the loops browser and select loops at the top. Click on the instruments option and select FX category. Audition some sounds or search for specific ones that could compliment your reverse reverb.

For this example, I selected a reversed snare and layered it underneath my previously created effect. *(line them up so that they both end at the same time)*

Get creative and layer more sounds or create new ones with MIDI instruments and various effects!

Remember! Make sure to save your work frequently!

Don't Forget! Export your files and save as new sound effects!

Mixing and Mastering Music

Objective

There is no right or wrong in audio; only what sounds good and what doesn't. Most audio producers agree that at the end of the day, whether it sounds good or not comes down to the mix. Put simply, mixing is the process of adding effects, panning, and volume automation to a track, and making adjustments with those tools to achieve the sound you're after. Mixing is a crucial part of audio production, and practicing the skills in this lesson will help you take your music to the next level. Don't forget - the first step to a great mix is to capture a great recording in the first place. The best mixes are built on solid, clean, quality recordings.

Outcomes

» Students will apply mixing techniques to previous classwork in order to gain an understanding of basic audio mixing concepts.

» Students will implement mixing techniques in current and future projects to further develop their own unique sound.

Saving and Submitting Your Work

The **Save** and **Publish** buttons are at the top right corner of the Mix Editor. Be sure to save your work frequently! Every time you work out a new element to your mix that you want to keep, click the **Save** button. For this exercise, you will revisit a previous project and apply different effects and automations to put a polish on it! When you are ready to submit your work, navigate to **edu.bandlab.com**, click on **Assignment 08 - Mixing**, and then **Start Assignment**, and choose the **Personal Project** option. Choose the project you want from the project library and click **Submit.**

Overview

There is no one single way to mix music; it's all about crafting your unique, individual sound. Your sound is your vibe. It's what sets your music apart from everyone else's and it's something you'll experiment with and develop over time. That being said, there are a few tried and true methods you can use to get started. Read through these starter mixing methods and start experimenting! You can stick with one method or combine elements from several. Make sure to take a look at the **Additional Resources** at the end of the lesson for supplemental reading on mixing drums and vocals.

Session Management and Organization

The first key to a successful mix is an organized session. Here are some tips to streamline your workflow so you can spend more time focused on your creativity and less time trying to navigate a messy session.

» Name all of your tracks.

» Organize your tracks in a way that makes sense to you. Some people like to group all their drums together, all the guitars, all the vocals and backup vocals, keys, etc. Some people like to organize their tracks based on where they fit in the frequency spectrum. Whatever works for you, just keep it consistent and know your system.

» Color code tracks based on the way you're organizing them. Are you grouping your drums together? Make them all the same color. Do you want to see your backup vocals clearly at a glance? Make them all the same color.

» Name loops and regions. This can be a good way to keep track of where you are in your song form. You can use names like "Verse 1," "Chorus 2," "Hook," "Bridge," and map out the structure of your song.

Method 01:
Starter Mixing Methods

Micro to Macro

This mixing method asks you to consider the different layers of your music from their smallest components to their largest components.

» Start with individual sounds and samples. To gain the most control over your mix, separate the pieces of your drums into their own tracks (i.e., have the kick drum, snare, and hi-hats all on separate tracks instead of in the same MIDI loop). Separating each sound this way gives you the option to adjust the effects and automations for each sound individually.

» Next, organize your session into drums, bass, guitars, keys, and vocals, and color code your tracks.

» Mute everything but the drums. Experiment with the overall volumes of the drums in relation to one another until you find a balance you like. Add EQ, compression, and any other effects you want to your drums. Percussion is the backbone of your song, so you want to make sure you don't add a lot of heavy effects that might wash them out. Once you're satisfied, mute the drums and repeat this process with your vocals (and backup vocals!). Do this with each group of tracks. **Don't forget to check out the supplemental reading for great content on how to mix drums, vocals, and many other instruments!**

» Now that you've balanced the mix between instrument groups, unmute everything and take a listen. How does it sound? Make further adjustments to volume and panning until you're satisfied with the general sound.

» At this point you're mostly done! You just need to make any final tweaks and fine tune your mix. Listen to it several times on different sets of speakers and headphones. **Analyze** what you like about it, **reflect** upon what needs more work, **and then make those changes.** It's best to sleep on your final mix - get it done a day before it's due so that you can give it a final check with fresh ears.

Method 02:
Drums Up

This mixing method is based on the idea that drums are the backbone of any mix, so drums are the best place to start. From there, you work your way "up" by adding in one instrument at a time.

» Organize your session into drums, bass, guitars, keys, and vocals, and color code your tracks.

» Mute everything but the drums. Mix the volumes and panning of your drums in relation to one another, and add any other effects you want to use.

» Bring the volume of your drums up to around -6dB. This will allow some head space for other instruments and effects to add volume. Keep an eye on the overall volume of your song as you go; you want the final output to be just under 0dB.

» Now unmute any bass or subbass (808) sounds. Add any effects you want on the bass and dial in the sound you want. Turn the bass tracks down all the way and bring the volume up from silence until it 'just fits' inside the drums, and the two sound balanced.

» Repeat this process with your keys, guitars, vocals, aux percussion and sound effects and transitions, in that order. Add them one at a time, apply any effects you want, and then bring their volume up from silence until it's sitting in a spot you think sounds good. You might have to go back and turn things down as you go - the more instruments and tracks you add to the mix, the louder it's going to get. When this happens, turn down the volumes of individual tracks instead of turning down the main volume.

» Once you've added everything in, you're ready to take a full listen of your mix! **Analyze** what you like about it, **reflect** upon what needs more work, **and then make those changes.** It's best to sleep on your final mix - get it done a day before it's due so that you can give it a final check with fresh ears.

Method 03:
Mixing by Frequency

Mixing by frequency takes a slightly different approach than Micro to Macro or Drums Up. Instead of organizing and mixing your session by instrument groups, you can choose to organize your session based on the frequency range or pitch range of the instruments.

» Organize and color code your tracks into frequency range groups for SubBass, Bass, Mid-Range, High, and Air.

» Start with your SubBass and Bass sounds then work your way up, adding effects and automations into your mix as you go. Pay attention to how the overall volume is affected as you add in more sounds, and adjust the levels of your individual tracks appropriately.

» Once you've added everything in, it's time for a full listen of your mix! **Analyze** what you like about it, **reflect** upon what needs more work, **and then make those changes.** It's best to sleep on your final mix - get it done a day before it's due so that you can give it a final check with fresh ears.

Final Thoughts

Each of these mixing methods is valid and can produce great results, but at the end of the day it comes down to your preference. What do you think sounds good? What is your vibe, what is your style? How are you using mixing tools and techniques to enhance your music? How do you set up your session to optimize your workflow? Consider these questions as you develop your sound. In our next lesson, we'll talk about mastering - the final step in preparing your audio for release!

Additional Resources

You might find the following links interesting and helpful as you continue to develop your mixing skills.

[Musician on a Mission Blog](#)

[Mastering the Mix Blog](#)

Mixing and Mastering Dialogue

Objective

There is no right or wrong in audio; only what sounds good and what doesn't. Most audio producers agree that at the end of the day, whether it sounds good or not comes down to the mix. Put simply, mixing is the process of adding effects, panning, and volume automation to a track, and making adjustments with those tools to achieve the sound you're after. Mixing is a crucial part of audio production, and practicing the skills in this lesson will help you take your podcast and storytelling to the next level.

Outcomes

» Students will apply mixing techniques to previous classwork
  in order to gain an understanding of basic audio mixing concepts.

» Students will implement mixing techniques in current and future projects to further develop their own
  unique voice.

Saving and Submitting Your Work

The **Save** and **Publish** buttons are at the top right corner of the Mix Editor. Be sure to save your work frequently! Every time you work out a new element to your mix that you want to keep, click the **Save** button. For this exercise, you will revisit a previous project and apply different effects and automations to put a polish on it! When you are ready to submit your work, navigate to **edu.bandlab.com**, click on **Assignment 08 - Mixing**, and then **Start Assignment**, and choose the **Personal Project** option. Choose the project you want from the project library and click **Submit**.

Overview

There is no one single way to mix a podcast; it's all about crafting your unique, individual sound. For a podcaster, a lot of that personality comes from how you use your voice, but it also comes from how you shape your voice with effects and balance it with the other elements of your episode. Your episode sound is your vibe and your audio identity. It's what sets your podcast apart from everyone else's and it's something you'll experiment with and develop over time. That being said, there are a few tried and true strategies you can use to get started! Make sure to check out the **Additional Resources** at the end of the lesson for supplemental reading on mixing for your podcast or short story.

Session Management and Organization

The first key to a successful mix is an organized session. Here are some tips to streamline your workflow so you can spend more time focused on storytelling and less time trying to navigate a messy session.

» Name all of your tracks. You should have a track for each voice in your session and tracks for music, bridges, and transitions.

» Organize your tracks in a way that makes sense to you. Whatever works for you, just keep it consistent and know your system.

» Color code tracks based on the way you're organizing them.

» Name loops and regions. This can be a good way to keep track visually of where you are in an interview or story.

Editing Dialogue

Listen through all of your recorded audio.

» If you're producing a podcast, cut out all the soundbites you want to keep from interviews and drag them down into a new track, leaving behind any audio you don't want to keep. Record any supplemental bridges you need to morph the interview into a cohesive story.

» If you're producing a short story or poem you should have multiple takes. Give each take its own track and listen through them one at a time. Pick out the best pieces of each take and collect them in a new track.

Regardless of what you are producing, start with broad cuts; don't get caught up in little details at this point. Mute the old tracks or deactivate the audio files to save CPU power. Don't delete them entirely from your session yet just in case you want to go back for something.

Now it's time to get nitty gritty. Listen back through each soundbite and clean up the audio. The goal here is to remove anything that would distract the listener from the story you're telling or make the listening experience uncomfortable.

» Remove long silences and condense audio clips along the timeline.

» Cut out long umms, errs, coughs, sneezes, noisy mouth sounds, etc. These naturally happen in conversation when we're figuring out what we want to say, but it can get boring for your listeners to hear people thinking out loud. You want to cut out the hesitations and get right to the point. You also get rid of any extraneous mouth noises. Remember that most of your listeners will be using headphones or earbuds, and that's as close to somebody's ears as you could possibly be. No one wants to listen to someone chewing on their tongue right up next to their ears.

» Remove inappropriate language including curse words, racial slurs, etc. All audio broadcasts must meet FCC standards and part of that is removing or altering offensive language. You can do this simply by cutting the word, or you can replace it with a beep or funny sound effect depending on the mood of your episode. Explore the FCC Website for more information.

» Add short fade ins and fade outs to every single audio clip. When you cut the audio out of the original file, it creates a little clicky pop sound called a digital artifact, which is distracting to the listener. This clicky pop is caused by the audio dropping suddenly to silence or coming up suddenly from silence, and is easily corrected with a couple of quick fades.

» Remember that even within these rules there is no real right or wrong. For example, you might leave a long pause or a sharp breath in an intense moment so that your listener feels that intensity. You might keep a banned word that is important in the context of the interview, but you will have to modify it so that it meets FCC guidelines. This is a space where you can use your audio skills to tell the story in a creative way that maintains the essence of the interview and the interviewee.

The last step in editing is to arrange your soundbites and any other elements like music, background sounds, or transition effects. Start at the beginning with your intro music or soundscape, and build out each segment of your podcast episode or each section of your story or poem.

Mixing and Mastering Your Podcast or Story

After you have finished cutting your podcast audio, it's time to mix!

» Start with your dialogue or voice tracks. Every voice is different, and so every voice will need its own special attention in the mixing process.

» Add an EQ (equalizer) to your first voice track. Cut frequencies below about 100Hz. Our voices don't resonate in those frequencies anyway, so cutting them can help remove any low-frequency background noise like trucks driving by outside or the air conditioner kicking on. Sweep the frequencies on your EQ to mold and shape each voice and bring out the best in your audio.

» Add a compressor to the voice track. A compressor on the individual track level will help to smooth out bumps in the audio and control variations in the audio's volume (like when someone tells a joke and suddenly everyone is laughing really loudly).

» Repeat steps 2-3 for each dialogue/voice track in your session.

» Adjust the general volume levels for each track and use automation to fade in and fade out music and transitions. Depending on your preferences, you might consider panning the different voices in your episode. When done tastefully, panning voices can create a feeling for the listener that they're sitting around a table with the people having the conversation.

After you are happy with your mix, it's time to move on to mastering. The goal of mastering dialogue is the same as the goal of mastering music. These final steps in the polishing process will ensure your audio is ready to be heard on any device or sound system, whether it's a pair of earbuds, a car speaker, or a loudspeaker system. Follow these steps to master your dialogue-based projects:

» Add noise. You heard me right, after we took out all of the extraneous noise, we're going to add in a very special kind of noise. You may have heard the term "white noise" or "pink noise" before. These types of noise sound fuzzy, like the sound of air coming through a heating vent, and can actually be pleasant for the listener when used appropriately. Check out this Noise Generator (mynoise.net) to listen to different colors of noise. Having a bed of noise in your project also helps to glue all of the pieces together and make your sound more rounded and whole. Add a new track to your project, and import a clip of white, pink, or brown noise. Lower the noise volume to silence and slowly raise it back up until it's just noticeable. Be careful not to go too loud! You should just barely perceive the noise, and it should layer underneath all other sounds.

» Mix all of your tracks down to one track. This will require you to export your track, and re-upload the .WAV file into a new track. Add EQ, Compression, and Reverb to the track and make any adjustments you feel are necessary. Note: This will be a very light touch! Most of your work is done, the cake is baked. This is just the frosting.

» When you're happy with your mix and master, make sure to listen to it on multiple sources. Listen in headphones, on a laptop, in a car, on your phone speaker, or any other source you want to check. When you're ready, submit your work and celebrate a job well done.

Final Thoughts

This tried and true mixing method is a solid starting point and can produce great results, but at the end of the day it comes down to your preference. What do you think sounds good? What is your vibe, what is your style, what is your personality? How are you using mixing tools and techniques to enhance your story? How do you set up your session to optimize your workflow? Consider these questions as you develop your mixing and mastering skills.

Appendices

Appendix A - Sample Syllabus

This course is designed to be a fun introduction to audio production tools whether the learning environment is formal or informal. In formal classrooms where grades exist, this syllabus can be a useful tool. Please take from it what you can use.

Course Description

In this course, you will learn the basics of digital audio production. You will use BandLab, an online DAW (digital audio workstation) to complete and return your work. Before the course, please go to **www.bandlab.com** and create a free account. Your instructor will provide a BandLab classroom code on the first day of class.

Learning Objectives

» Build technical skills with audio equipment and software

» Use audio production tools as a medium for self-expression

Expected Outcomes

» Students will be able to demonstrate mastery of basic audio production tools, techniques, and vocabulary

» Students will create their own original audio pieces in formats of their choice
   (i.e. music, podcast, sound design, etc.)

» Students will share their work with peers and family as part of a culminating showcase at the end
   of the semester

Curriculum

There are a total of 11 lessons and assignments for this course. The first 6 lessons cover the technical skills you will need to create music-based and dialogue-based audio. The final 3 assignments will be open-ended opportunities to make whatever type of audio you are interested in creating. Lessons 07 and 08 will overlap with Assignments 01 and 02. These lessons on mixing and mastering audio will be based on what type of project you're working on, and will help you put a final polish on your audio.

	Lesson/Assignment Title	Week	Points	Last Day to Turn In
Lesson 01	Overview of Mix Editor	1	20	End of week 9
Lesson 02	Create Music with MIDI	2-3	20	End of week 9
Lesson 03	Effects and Automation Basics	4	20	End of week 9
Lesson 04	All About Me Podcast	5-6	20	End of week 9
Lesson 05	Find the Hook	7	20	End of week 9
Lesson 06	Building a Hookt	8-9	20	End of week 9
Assignment 01	Open-ended Project 01	10-12	80	End of week 18
Lesson 07	Creating Original FX	11	20	End of week 18
Assignment 02	Open-ended Project 02	13-15	80	End of week 18
Lesson 08	Mixing and Mastering	14	20	End of week 18
Assignment 03	Open-ended Project 03	16-18	80	End of week 18

Assessment

Grading Lessons

In our class time lessons, we will be focusing on developing your technical skills and comfort navigating a DAW. Lessons are assigned on Mondays and due on Fridays, or at the end of the week detailed in the above chart. Grading for all lessons will be based upon the following rubric, and will be completed by the instructor within a week of submission. Any score lower than full points will be returned to you with useful feedback on how to improve your score. If you take that feedback and improve your session, you can resubmit that work at any point before the 'last day to turn in' date listed above for reassessment. It's up to you if you want to try and raise your grade. Resubmitting work does not guarantee full points; additional points will only be granted when a clear effort is made to improve based on **all** feedback given.

0	I did not attempt the lesson.
5	I demonstrated *one* technical skill taught in the lesson.
10	I demonstrated *some* of the technical skills taught in the lesson.
15	I demonstrated *most* of the technical skills taught in the lesson.
20	I demonstrated *all* of the technical skills taught in the lesson.

Grading Assignments

Assessment for all assignments (open-ended projects) will be based upon the following **S.M.A.R.T. Goals Rubric**. The truth is there is no right or wrong in audio, just what sounds good and what doesn't. And even that is subjective based on an individual person's interests and tastes. While these assignments are an opportunity to explore your own creativity, grading based on creativity alone is subjective and we try to avoid it. Instead, **you will be graded on your ability to set goals and see them through, collaborate and communicate with your classmates, manage your time wisely, receive and give feedback, and reflect upon your work.** Grading for projects in this class will be a collaborative effort between student and instructor.

Digital Audio Project S.M.A.R.T. Goals and Planning

(If working in a group, each team member must turn in their own completed sheet to get credit for their goals)

Your Name: Your Team Members:

A **S.M.A.R.T. Goal** is a method of communicating your plans in a way that includes specific information for evaluation and reflection. You will be making a goal individually or with a group, and then working on this goal over several weeks.

S.M.A.R.T. Goal: (take notes for each element)

S: Strategic and Specific

M: Measurable

A: Attainable and Action-Oriented

R: Realistic and Relevant

T: Time-Bound

Your Final S.M.A.R.T. Goal:

Create an action plan for your project. Write down the project due date, then list tasks that you need to complete each day in order to complete your project efficiently and effectively.

Project Due Date:

	Week 1	Week 2	Week 3
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			

Category:	10	5	1
Time Management & Work Ethic	I used class time wisely and managed my work well. Work is completed on time. I put in extra effort to help others and provided an example for others to follow.	I used my class time okay. I needed to be reminded to work once in a while. I may have talked more than worked. I did not help others.	My time was not managed well. I spent very little time on task. I did not work unless constantly reminded. I had a poor attitude for this project.
Daily Tasks	I showed effort and completed tasks each day that I am proud of. My work shows thought and care. I used my S.M.A.R.T. Goal as a guide and completed what I set forth to do.	I showed some effort and mostly completed my daily tasks. I used my S.M.A.R.T. Goal as a guide and completed most of what I set forth to do.	I showed little to no effort and didn't complete my daily tasks. I did not use my S.M.A.R.T. Goal and didn't get much done.
Classroom Dynamics	I communicated effectively with my classmates and teachers about my project's needs (i.e. studio time, interview guests), and coordinated with my classmates schedules so that we could all support each other.	I communicated okay with my classmates and teachers about my project's needs. I may have goofed around a little more than I worked.	I did not communicate effectively with my classmates and teachers about my project's needs. I waited until the last minute to schedule studio time or interviews. I distracted my classmates from their work.
Reflection Answers (below)	My answers are reflective and share descriptive details. My answers are given in complete sentences and fully answer the question. I correctly use relevant vocabulary to explain my ideas and thoughts.	My answers are sufficient, but lack details. My answers are in mostly full sentences, but are vague and do not fully address the question. I used appropriate vocabulary, but didn't demonstrate a full understanding of the information.	My answers give no descriptive information and do not answer the question. My answers are sentence fragments, and vocabulary is misused or not used at all.

Please answer the following reflective questions in complete sentences and elaborate with specific examples. Use descriptive details and appropriate vocabulary. Please type or handwrite your answers on a separate piece of paper and staple to this sheet before turning in.

1. **In what specific ways did you work on your daily tasks? How did this play to your strengths? How could you have done better? What do you wish you had done differently?**

2. **How did you work with your classmates and teachers to accomplish your goal? wwWhat was challenging? What was easy? What about this project are you especially proud of?**

3. **Based on your experience with this project, where do you feel you need to grow? What steps can you take to begin that growth?**

Student Evaluation Total:	**/40**
Teacher Evaluation Total:	**/40**
Project Grade:	**/80**

Attendance

We do not give a grade for attendance in this class, however consistent attendance is crucial. Your instructors respect your time, and respect that you are a busy individual with an entire life outside of audio class. **We do not expect you to do homework or classwork outside of our class time, but we do expect you to come to class and be fully present while we're together.** If you come to class consistently, you will have all the time you need to complete your work and more. If you are experiencing any circumstances that make it difficult for you to join us in class or during instructor office hours, please reach out to us. We can be flexible and tailor lessons and assignments to fit your needs and we're happy to do so! We only ask that you communicate with us about what you need so that we can set you up for success.

Late Work Policy

Lessons are assigned on Mondays and due on Fridays, or at the end of the week detailed in the lesson schedule chart on page 2. Larger projects have a 3-week timeline from assigned date to due date, and all work will be graded and returned within a week. Any score lower than full points will be returned to students with useful feedback on how to improve their score. Late work will also be accepted up until the 'last day to turn in' date listed in the syllabus. **This is a generous late work policy and will only be modified when a student has an extenuating circumstance and communicates their needs to us promptly. If you attend class regularly, you will have all the time you need to complete your work and more. If you wait until the last weeks or days to join us in class we will not be able to give you a grade, and so you will receive a failing grade for the course. It is impossible to cram 9 weeks of learning into a week or a few days. It is impossible to develop mastery of basic audio technologies in a few days. The only way to pass this class is to attend this class from the beginning.** Administration will be informed and kept up to date on any policy modifications for individual students.

Culminating Presentation

At the end of the semester, we will present our work in some form. This looks different with every class - sometimes it's a SoundCloud playlist, sometimes it's a performance for the school, or it could be anything in between. As we explore audio together, we'll discuss as a class what we want to share and how we want to share it.

Content Standards

This course satisfies a 0.5 CTE credit for CIP Code 100203 - Recording Arts

This course satisfies the [WA K-12 Media Arts Standards: High School Advanced](#)

- » **Anchor Standard 1** - Generate and conceptualize artistic ideas and work
- » **Anchor Standard 2** - Organize and develop artistic ideas and work
- » **Anchor Standard 3** - Refine and complete artistic work
- » **Anchor Standard 4** - Select, analyze, and interpret artistic work for presentation
- » **Anchor Standard 5** - Develop and refine artistic techniques and work for presentation
- » **Anchor Standard 6** - Convey meaning through presentation of artistic work
- » **Anchor Standard 7** - Perceive and analyze artistic work
- » **Anchor Standard 8** - Interpret intent and meaning in artistic work
- » **Anchor Standard 9** - Apply criteria to evaluate artistic work
- » **Anchor Standard 10** - Synthesize and relate knowledge and personal experiences to make art
- » **Anchor Standard 11** - Relate artistic ideas and works with societal, cultural, and historical contexts to deepen understanding

Understanding the Syllabus

I, _____ and my parent/guardian _____ understand the syllabus and expectations for the Digital Audio Basics - BandLab course. We also understand that we can ask questions about the syllabus or the class at any time. If circumstances make it difficult to attend class, we agree to communicate promptly with instructors to discuss and achieve the appropriate accommodations.

Student Signature: _____

Parent/Guardian Signature: _____

Appendix B - Sample Rubrics

Lesson Rubrics - Basic

0	I did not attempt the lesson.
5	I demonstrated *one* technical skill taught in the lesson.
10	I demonstrated *some* of the technical skills taught in the lesson.
15	I demonstrated *most* of the technical skills taught in the lesson.
20	I demonstrated *all* of the technical skills taught in the lesson.

Assignment/Project Rubric

0	I did not attempt the assignment / project
20	I incorporated *one* technical skill taught in lessons in my project.
40	I incorporated *some* of the technical skwills taught in lessons in my project.
60	I incorporated *most* of the technical skills taught in lessons in my project.
80	I incorporated *all* of the technical skills taught in lessons in my project.

Appendix C - Contact Us

Thank you so much for trying out our curriculum! If you have questions, feedback, or are looking for additional support for your digital audio program, please reach out to us at audio@foundry10.org. Happy music-making!

This curriculum was developed by Frank Walton, Jr., Chelsi Gorzelsky, and Kate Falconer at foundry10.

About foundry10

foundry10 is an education research organization with a philanthropic focus on expanding ideas about learning and creating direct value for youth. In collaboration with diverse partners, we surface, evaluate, and share opportunities to better support youth learning both inside and outside the classroom. We do this through applied and experimental research, as well as collaborative philanthropy and educational programming rooted in evidence-based best practices.

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