MUSIC TECHNOLOGY
GRADES 6-8

THE EWING PUBLIC SCHOOLS
2099 Pennington Road
Ewing, NJ 08618

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Written by: Music Teachers

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In accordance with The Ewing Public Schools' Policy 2230, Course Guides, this curriculum has been reviewed and found to be in compliance with all policies and all affirmative action criteria.

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Preface

Music Technology is a course designed to introduce students to the variety of ways that technology plays a role in music production and sound reinforcement. Students will learn how to use Digital Audio Workstation software (DAW), mix live audio in concert and theatrical settings, and write original songs using recorded music excerpts better known as loops. Students will also be introduced to the science of sound and the basic principles of acoustics. Throughout this course, students will learn how these skills apply to the many careers associated with the music and performing arts industry.

Pacing

This enrichment course will be offered to 6th, 7th, and 8th grade students. It is designed as a semester long course that will be taught for 42 minutes every other day.

Unit 1: Acoustics: The Science of Sound (13 Days)

Why Is This Unit Important?

Understanding the scientific concepts behind sound production and sound perception are paramount to the success of a live or recorded performance. Throughout this unit, students will gain a basic understanding of the science behind sound waves, acoustics, and how the human ear works.

Students will also gain an understanding that sound is measured in decibels and how to interpret decibel measurements.

Enduring Understandings:

- Students will learn the various properties of sound waves.
- Students will learn how sound travels.
- Students will learn how sound is received through the ear.
- Students will learn the basic structure of the human ear.
- Students will understand the relationship of the shape of the sound wave in relation to the pitch and the volume.
- Students will learn what a decibel is, and how to interpret decibel measurements.
- Students will conduct scientific experiments relating to sound waves and decibel levels.

Essential Questions:

- What is a sound wave?
- What does the height of the sound wave represent?
- What does the width of the sound wave represent?
- How does sound travel?
- How does your brain receive a sound wave?
- What are the three main parts of the human ear? How do they work?
- What is a decibel?
- What is the acceptable decibel range for the human ear?
- What happens if the decibel levels are too high?
- What is a hypothesis?
- What is data and how do you collect it?
- What is a conclusion?

Acquired Knowledge:

- Students will learn that sound is transmitted as pressure waves vibrating particles in a medium.
- Sound is transmitted by particles in a solid, liquid, or gas colliding with each other. The colliding of these particles creates a wave in which the sound travels.
- When sound waves enter the ear, they vibrate the ear drum, the ossicles, and the tiny hair cells in the cochlea.
- The hair cells in the cochlea translate these vibrations of the sound wave into electrical impulses that travel to the brain which interprets sound.
- Decibel is the unit used to measure the intensity of a sound.
- The acceptable decibel range for the human ear is 0-120dB, with 140 being the threshold of pain.
- If decibel levels are too high, the listener runs the risk of hearing loss.

Acquired Skills:

- Students will acquire the basic skills understandings of how to measure soundwaves which will be applied throughout the enrichment course.
- Students will understand what a safe decibel level is and how to apply it when mixing live audio or recording.
- Students will acquire the skills to be able to accurately measure the decibel level of a location.

Assessments:

Formative assessment:

- Informal observation during discussion
- Writing tasks
- Partner pair share

Summative assessment:

- Unit Test

Benchmark assessment:

- Quizzes

Alternative assessment:

- Group project

Interdisciplinary Connections:

- Students will explore the science behind soundwaves (science/physics)
- Students will measure soundwaves and calculate decibels (math)
- Students will learn how the human ear perceives sound (science/biology)

Technology:

- **Instructional videos from YouTube and Google Drive**
    - **Nemours Kids Health: How Your Ears Work https://www.youtube.com/watch?v=HMXoHKwWmU8**
    - **Signia Hearing: How Hearing Works https://www.youtube.com/watch?v=4AcS2AfJ9OM**
    - **PBS Digital Studios: Sound Crash Course in Physics https://drive.google.com/file/d/0B63fbplarpHZS2F0QTZERFU1ZTQ/view?usp=sharing&resourcekey=0-XiBmnuf4yFnZWGoI3mf0YQ**
- **Decibel Meter App**
- **Audacity or other DAW software**

Suggested Learning Experiences and Instructional Activities

- Provide students with online decibel meters for Chromebooks.
- Provide Students with an online DAW such as Bandlab to help visualize sound waves.
- Use subtitles when presenting YouTube videos during class.

Soundwave Physics Activity.

- **Student reflection:** After students are introduced to the science of sound, they will be tasked to demonstrate how pitch and decibel levels affect soundwaves.
- **Class Participation:** The class will be divided into small groups and will access online pitch generators, decibel meters, and an online DAW such as Bandlab. Using Chromebooks, they will experiment with manipulating soundwaves and observing how decibel levels and frequencies (pitch) change the shape of soundwaves.
- **Teacher Demonstration:** The instructor will show the students how volume alters sound waves by projecting DAW software to the class. They will see that pitch will change the wavelength of a sound wave and how volume will expand the wavelength longitudinally. The instructor will demonstrate that at high volumes, soundwaves distort when recording and that an audio engineer needs to avoid peaking while recording.
- **Peer Practice:** The students will try to duplicate the waveforms that the teacher demonstrated.
- **Student Evaluation:** Now that students can use volume and pitch to alter soundwaves in DAW software, they will be able to identify when sound peaks, when it is high in pitch, and when it is low in pitch.

NJSLS Standards:

1.3A.8.Cr1a
1.3A.8.Cr2a
1.3A.8.Cr2b
1.3A.8.Cr3a
1.3A.8.Cr3b
1.3A.8.Pr4a
1.3A.8.Pr4b
1.3A.8.Pr4e
1.3A.8.Re8a
1.3A.8.Cn10a
1.3A.8.Cn11a

Unit 2: Introduction to Audio Engineering (13 Days)

Why Is This Unit Important?

Audio engineers balance, process, and mix live or recorded audio. They work with the technical aspect of live sound reinforcement and recording. A well-versed knowledge of microphones, mixing consoles, DAW software, and amplifiers is a necessity when working in the performing arts industry.

Throughout this unit, students will be introduced to microphones, mixing consoles, industry specific terminology, and DAW software.

Enduring Understandings:

- Students will learn about the three main types of microphones (dynamic, condenser, ribbon).
- Students will be able to identify the parts of a mixing console and understand their purpose.
- Students will learn about proper microphone placement when mixing live audio.
- Students will learn how to properly tape a wireless microphone to an actor and gain experience with theater sound reinforcement techniques.
- Students will be able to compare the similarity and differences between live mixing consoles and the virtual console in Bandlab or Audacity.
- Students will be able to identify and define terms relating to digital audio editing.
- Students will learn the concept of loops and multi-track recording/mixing.

Essential Questions:

- What is a soundscape? What makes up the soundscape in the room? Does it ever change or does it stay the same?
- What is gain?
- What is compression?
- What is panning?
- What is clipping?
- What is pitch?
- What is a synthesizer?
- What is a midi controller
- What is a microphone?
- What are the three main types of microphones and how are they different?
- How does an actor in a musical use a microphone?
- What are headphones?
- What is a DAW?
- What is audacity?
- What is Bandlab?
- What is a loop?

- What is a waveform?
- What is a measure?
- What is multi-tracking?

Acquired Knowledge:

- A soundscape is a collection of the sounds heard in a particular location, considered as a whole.
- Gain is the amount of amplification that is applied to an audio signal.
- Compression is a process that reduces the span between loud and soft parts of an audio signal.
- Panning is the distribution of an audio signal into the left or right channel of a stereo mix.
- Clipping is a distortion of a waveform that occurs when a signal level is higher than the maximum output voltage of an amplifier or the maximum limits of a digital recording.
- Pitch is the frequency produced by a note of music or sound.
- A synthesizer is an electric instrument capable of producing a wide range of sounds.
- A midi controller is a device (usually a keyboard) that accesses virtual sounds in a live or recording.
- A microphone is a device that converts acoustic sound into an electrical signal.
- Microphone technique is important for a live performer whether they are using a handheld microphone or a wireless lavalier microphone when they are onstage participating in a musical.
- Headphones are a pair of small speakers designed to be held in place close to the user's ears.
- DAW is an abbreviation for Digital Audio Workstation. It is allows users to record and mix audio on a computer.
- Audacity is a DAW used for recording and audio editing.
- Bandlab is a DAW used for recording and audio editing.
- A loop is a short sample of a sound.
- A waveform is a visual representation of an audio signal.
- Multi-tracking is the use of several audio tracks in an audio editor.
- A measure is a section of music that contains a specified number of beats (usually four beats in popular music).

Acquired Skills:

- Students will know how to use and properly place microphones for a live or recorded performance.
- Students will know how to operate a mixing console for live or recorded performances.
- Students will know how to operate DAW software such as Bandlab or Audacity.
- Students will know basic recording and live sound terminology.

Assessments:

Formative assessment:

- Informal observation during discussion
- Writing tasks
- Partner pair share

Summative assessment:

- Unit Test

Benchmark assessment:

- Quizzes

Alternative assessment:

- Group project

Interdisciplinary Connections:

- Students will explore the science behind soundwaves (science/physics)
- Students will measure soundwaves and calculate decibels (math)
- Students will learn how electromagnetism is used with microphone technology to convert acoustic sound waves to electronic impulses (science)
- Students will learn how electromagnetism is used with speaker technology to convert electrical impulses to acoustic soundwaves.

Technology:

- **Instructional videos from YouTube and Google Drive**
  - **A Quick Guide to Microphones** https://www.youtube.com/watch?v=PE6Qn4ZiEyo
  - **How Its Made: Microphones** https://www.youtube.com/watch?v=WTy4b4kzh_c
  - **Ribbon mics, how do they work?** https://www.youtube.com/watch?v=_59lfbPbpXk
  - **Inside the Rhapsody – Queen (Queen guitarist, Brian May shows how Bohemian Rhapsody was recorded) https://www.youtube.com/watch?v=m4qYBqIieEk**
- **Decibel Meter App**
- **Audacity, Bandlab, or other DAW software**

Suggested Learning Experiences and Instructional Activities

- Provide Students with an online DAW such as Bandlab to help visualize sound waves.

- Use subtitles when presenting YouTube videos during class.
- Allow students access the auditorium mixing console
- Allow students access to condenser and dynamic microphones.

"Row, Row, Row Your Boat!": Front of House Mixing Activity

- **Student reflection:** After being introduced to microphones and to the mixing console, students will be asked to practice mixing sound in a live performance on the auditorium stage.
- **Class Participation:** The class will be divided into small groups with four students on stage and one student at the mixing console. The students onstage will recite "Row, Row, Row Your Boat" as a round. The student at the mixing console will adjust the input level of each microphone until the remaining students can hear the onstage performers blend together. Once the voices are blended, the group will rotate so that a new student is able to practice blending voices on the mixing console.
- **Teacher Demonstration:** Once the students are comfortable mixing onstage performers, the teacher will introduce equalization or EQ band controls and their function. The instructor will explain that since everyone's voice has a different timbre, boosting or cutting frequencies is important so that an audience can clearly hear the performer. The instructor will demonstrate that performers with high pitched voices may need a boost in the low or midrange frequencies so that their voice doesn't sound thin. The instructor will also demonstrate that performers with low sounding voices may need the cut the low frequencies and boost the high frequencies so that their voice doesn't sound muffled.
- **Peer Practice:** The students will perform a microphone check with four performers and practice optimizing stage volume and EQ.
- **Student Evaluation:** The class will repeat the "Row, Row, Row Your Boat" activity and discuss whether or not the performance had a better blend now that the EQ was optimized for each performer.

NJSLS Standards:

1.3A.8.Cr1a
1.3A.8.Cr2a
1.3A.8.Cr2b
1.3A.8.Cr3a
1.3A.8.Cr3b
1.3A.8.Pr4a
1.3A.8.Pr4b
1.3A.8.Pr4e
1.3A.8.Re8a
1.3A.8.Cn10a
1.3A.8.Cn11a

Unit 3: The History of Audio Recording (13 Days)

Why Is This Unit Important?

The phonograph, invented by Thomas Edison in 1877, was the first device that used wax cylinders to record and playback audio recordings. Soon after the invention of the wax cylinder, audio recordings were recorded and distributed on shellac or vinyl discs (records), magnetic wire, magnetic tape, digital compact discs, downloadable digital audio files (mp3/.wav), and streaming audio files. Even though audio formats have changed since 1877, the terminology and recording techniques used today find their roots in older technologies.

Throughout this unit, students will explore and hear how music sounded on wax cylinders, shellac '78 records, vinyl LP records, cassette tapes, Compact Discs (CD), and streaming digital audio. They will discuss what advantages and disadvantages each format offers to listeners. They will also learn how each recording medium shaped songwriting throughout the years.

During this unit, students will also be introduced to copyright law and how a songwriter can claim ownership their work. They will learn how to use the US Copyright Office's website to register an original musical work. Students will also learn about landmark court cases involving copyright infringement and the precedents that they established for songwriters today.

Enduring Understandings:

- Students will be able to identify the main music recording mediums and how consumers used them.
- Students will comprehend the difference between analog and digital music technology.
- Students will have an understanding of digital music as a whole and its role in music history's past and present.
- Students will comprehend how the iPod has revolutionized the music industry.
- Students will be able to recognize industry terminology and trace its roots to previous technologies.
- Students will learn how to register their original work with the US Copyright Office.
- Students will learn about landmark copyright infringement cases and understand why songwriters need to keep them in mind when creating new audio compositions and recordings.

Essential Questions:

- When was the first human voice ever recorded and on what device?
- How did Edison's wax cylinder work?
- How does a vinyl record work?
- What is an analog recording?
- What is a digital recording?
- How does an audio cassette tape work?
- What product did Sony introduce in 1978 that sold over 100 million units?
- How does a CD work?
- What was the first digital music technology developed?
- What does MP3 stand for and how is it used?
- When was the first digital audio player introduced? What was its name?
- In 2001, Apple Computers introduced their own MP3 player. What was its name?
- Who was the founder/CEO of Apple Computers?
- What was the initial reaction from the music industry regarding Apple's iTunes store (and having each song sold for 99 cents)?
- What is the iTunes store and how did it change the music industry?
- How did the iPod change the way we listen to music and why was it popular?
- How did the iTunes store make CD stores go out of business?
- How do I copyright a song?
- What is the difference with being influenced by a previous work and copyright infringement when writing a song?
- How do landmark court cases change the rules of songwriting?
- What are the rules to sampling music?
- What is a royalty?

Acquired Knowledge:

- The transition from analog to digital music recording technology happened within the span of just a century.
- Students will know the functionality of a phonograph, LP, audio cassette tape, Walkman, CD player, MP3 player/iPod, and streaming audio services.
- Until the invention of the CD by Sony in 1988, all music recording and playback technology was analog in nature. The CD was the first piece of technology to use computer language (binary code) to represent musical data that had to be converted by a 'computer' in a playback device.
- An MP3 file is a compressed sound sequence in a very small file on the computer. An MP3 player device plays these files back, as well as computers.
- Many MP3 players were introduced in the mid-1990s; however, they were limited by their small disk capacity and battery life.
- The iPod was introduced in 2001 and was the most popular MP3 player to include a long-lasting rechargeable battery and an internal hard drive to store over 1,000 songs.
- The invention of the iPod led to the introduction of the iTunes store, a means to purchase music in digital formats.

- The invention of the iTunes Store was in response to many people downloading music illegally, using P2P (peer to peer) software such as Napster and Kazaa.
- Streaming Services such as Apple Music and Spotify dominate the way people consume music.
- When a consumer uses a streaming service, they do not own a physical or digital copy of musical work. They only have the ability to access it through a subscription fee.
- Royalties are payments made to a songwriter or an owner of an original musical work.
- Artists must have permission from the original songwriter before they can use it for an original musical work. This may or may not expand songwriting credit and royalty payouts to the original artist.

Acquired Skills:

- The students will be able to identify the different audio recording formats and mediums.
- The students will be able to learn recording terminology and what audio format it originated from.
- The Students will be able to define 'copyright infringement'.
- The Students will be able to copyright their original work.
- The students will understand how landmark copyright cases have shaped songwriting and the music industry.

Assessments:

Formative assessment:

- Informal observation during discussion
- Writing tasks
- Partner pair share

Summative assessment:

- Unit Test

Benchmark assessment:

- Quizzes

Alternative assessment:

- Group project

Interdisciplinary Connections:

- Students will explore how analog audio is captured by recording devices on different audio formats. (science/physics)
- Students will learn how playback devices differ and why some modern formats lose portions of the frequency ban. (science)
- Students will learn how copyright law plays into songwriting and some of the court cases that have impacted the music industry. (Social Studies/History)

Technology:

- **Instructional videos from YouTube and Google Drive**
  - **County College of Morris: Edison Wax Recording, Guitar and Vocals** https://www.youtube.com/watch?v=4wtifAGsV3k
  - **How Record Players Work** https://www.youtube.com/watch?v=eJFuRnolwWk
  - **Introducing the Amazing Compact Disc** https://www.youtube.com/watch?v=_Tx6TYnPat8
  - **Rick Beato: LED ZEPPELIN vs SPIRIT Lawsuit | Stairway To Heaven Comparison https://www.youtube.com/watch?v=-MBKJDmE-OQ**
  - **Rick Beato: Blurred Lines Vs. Got To Give It Up Judgment $5.3 MILLION https://www.youtube.com/watch?v=-1COYitP8hI**
  - **Adam Neeley: Did Olivia Rodrigo steal from Paramore? https://www.youtube.com/watch?v=qX7a2p5_JsM**

- **Record player**
- **Cassette player**
- **CD player**
- **Streaming Music Service**
- **Audacity, Bandlab, or other DAW software**

Suggested Learning Experiences and Instructional Activities

- Provide Students access to a record player, cassette player, CD player, and streaming music service.
- Use subtitles when presenting YouTube videos during class.

You Be the Judge!: Copyright Infringement Cases and How They Influence the Music Industry.

- **Student reflection:** Students will watch short analysis videos on contemporary copyright lawsuits such as Rick Beato's "Led Zeppelin vs Spirit lawsuit" and "Blurred Lines vs Got To Give It Up Judgement" videos and Adam Neeley's "Did Olivia Rodrigo steal from Paramore?" video. They will discover that artists build musical ideas off of existing music to create new works and how that can be a fine line to walk as a songwriter.

- **Class Participation:** The class will be divided into small groups. They will hear audio excerpts from "Ice Ice Baby" and "Under Pressure", "The Last Time" and "Bittersweet Symphony", "Run Through the Jungle" and "The Old Man Down the Road". They will discuss whether or not the newer song copied the older one and if the original artist should receive songwriting credits and determine a winner in each case.
- **Teacher Demonstration:** Once each student group determines whether or not each copyright claim is valid, the instructor will act as a forensic musicologist and try to convince the class to reconsider their position using audio examples.
- **Peer Practice:** The students groups will meet again and determine whether or not they should change their ruling and share their results with the class.
- **Student Evaluation:** The instructor will reveal which artist the real courts ruled in favor of in each landmark case and explain how each ruling shaped the music industry. The students will reflect on the rulings and share how they think it may impact their own songwriting.

NJSLS Standards:

1.3A.8.Cr1a
1.3A.8.Cr2a
1.3A.8.Cr2b
1.3A.8.Cr3a
1.3A.8.Cr3b
1.3A.8.Pr4a
1.3A.8.Pr4b
1.3A.8.Pr4e
1.3A.8.Re8a
1.3A.8.Cn10a
1.3A.8.Cn11a

Unit 4: Songwriting Using a DAW (13 days)

Why Is This Unit Important?

This unit introduces students to modern songwriting techniques and how to use a DAW such as Bandlab to create a song using loops or original recordings. Sampling repeated musical excerpts or loops has been a popular songwriting technique since tape recording was introduced. This technique was used frequently in the hip hop or rap genre since the 1970s, but it has been used in jazz, reggae/dub, country, rock, and in other forms of popular music. Today, most recording engineers use DAWs or digital audio workstations and incorporate a mix of loops and studio recordings to create a song.

Throughout this unit, students will learn how to use loops to create songs in AB (verse and chorus) and/or ABC (verse, chorus, bridge) format. They will learn how to use the plugins (pitch shift, reverse, or other special effects) in Bandlab to alter loops within their song.

Enduring Understandings:

- Students will understand how to incorporate all the skills acquired in previous units to be able to create their own song projects.
- Students will learn how to input loops in Bandlab.
- Students will learn that songs are rhythmically broken up into measures.
- Students will learn that most pop song measures contain four beats.
- Students will learn how to use measures to "grid" their songs.
- Students will learn that AB songwriting format has a verse and a chorus (hook).
- Students will learn that ABC songwriting format has a verse, a chorus (hook), and a bridge.
- Students will understand how to archive their projects.
- Students will learn how to share and appropriately critique music.
- Students will learn the difference between a soundscape, instrumental, and vocal based songs.

Essential Questions:

- What type of final project song would you like to create (soundscape, instrumental track, a song with vocals)?
- How do you demonstrate the skills needed to be able to create the exact sound/effect required for your song?
- What is a verse?
- What is a hook (chorus)?
- What is a bridge?
- What is a measure?
- What is a grid?

- What is a track?
- What is a stem?
- What is a groove and what are trap beats?
- How do you share your final project?
- How do you objectively critique a composer's work?

Acquired Knowledge:

- Pop music is made of four basic track elements (percussion (beat), basslines, chords, and lead voices or instruments)
- Students will learn that most pop music contains a verse and a chorus, or a verse, chorus, and a bridge.
- Students will learn that producers use volume or non-tonal sound effects to set up a hook or chorus.
- Students will learn that the main idea of a song is the chorus.
- Students will learn how to grid a project in Bandlab.
- Students will learn how to create verse, chorus, and bridges using drag and drop loops.

Acquired Skills:

- Students will learn how to "grid" their song by choosing measure length and tempo (speed in bpm).
- Students will learn how to choose basic elements (beat, basslines, chords, lead instruments or vocal) to create a pop song.
- Students will learn how to combine musical ideas and follow a song form (AB, ABC, etc.).
- Students will learn how to add special effects, non-tonal sounds, and volume effects to keep listeners engaged.
- Students will learn how to objectively critique a composition and give meaningful feedback.

Assessments:

Formative assessment:

- Informal observation during discussion
- Writing tasks
- Partner pair share

Summative assessment:

- Unit Test

Benchmark assessment:

- Quizzes

Alternative assessment:

- Group project

Interdisciplinary Connections:

- Students will songwriting techniques and compare them to storytelling and sentence structures. (language arts)
- Students will learn how to divide an original song into four beat measures to create a groove. (math)
- Students will learn that most pop songs repeat ideas into 4, 8, and 16 bar phrases to form verses, choruses, and bridges to tell a story. (math, language arts)
- Students will learn how to objectively critique their classmates' work and provide meaningful feedback. (language arts)

Technology:

- **Instructional videos from YouTube and Google Drive**
  - **Rick Beato: What Makes This Song Great? Max Martin** https://www.youtube.com/watch?v=cBDJDZAo41c&t=287s
  - **Rick Beato: What Makes This Song Great? Adele** **https://www.youtube.com/watch?v=sUWxKX0hi5M**
- **Bandlab or other DAW software**

Suggested Learning Experiences and Instructional Activities

- Provide Students with Bandlab and a way to share their compositions with the class.

You're a Big Time Producer

- **Student reflection:** Students will watch two "What Makes This Song Great?" videos from renowned producer and YouTuber, Rick Beato. While they watch the videos, they will see how producers like Max Martin use DAW software to create a pop song for Ariana Grande and Adele. The students will brainstorm on how they can incorporate "producer tricks" when making a hit record.
- **Class Participation:** Students will use Bandlab to create an original song using "drag and drop loops". They will be tasked to at least create a verse and a hook that contains a drum groove, a bassline, a chord instrument (guitar/piano), and a lead instrument loop.
- **Teacher Demonstration:** The instructor will demonstrate how to create simple pop song that follows the assignment with the class and add special effects to add emphasis to the hook.
- **Peer Practice:** The students will continue to work on their original song projects and incorporate special effects to help emphasis their hook.

- **Student Evaluation:** Each student will play their original song for the class. After each song is played, the students will share what they thought "made the song great" and what the composer could do to further improve their work.

NJSLS Standards:

1.3A.8.Cr1a
1.3A.8.Cr2a
1.3A.8.Cr2b
1.3A.8.Cr3a
1.3A.8.Cr3b
1.3A.8.Pr4a
1.3A.8.Pr4b
1.3A.8.Pr4e
1.3A.8.Re8a
1.3A.8.Cn10a
1.3A.8.Cn11a

Appendix

21st Century Skills & Career Readiness Practices

- **CRP3. Attend to personal health and financial well-being.** Music appreciation can be a key factor in maintaining a positive emotional state. Students will be exposed to different genres of music and will be given the tools necessary to express themselves creatively through songwriting.

- **CRP4. Communicate clearly and effectively and with reason.** Throughout the course, students will complete a variety of class presentations and will need to convey their research and opinions on different musical works.

- **CRP6. Demonstrate creativity and innovation** Students will create their own original compositions using Band lab or other DAW software.

- **CRP10. Plan education and career paths aligned to personal goals.** Throughout the course, students will be exposed to a variety of music careers such as; recoding audio engineering, live sound audio engineering, record production, acoustic engineering, copyright law, and songwriting.

- **CRP11. Use technology to enhance productivity.** Students will learn how to use audio engineering tools such as decibel meters, microphones, mixing consoles, speakers, and DAW software to mix and create music.

Technology Integration

- **8.1.12.A.1 Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.** Students will use YouTube, Bandlab, and Canvas to create and share their original compositions.

- **8.1.8.E.1 Effectively use a variety of search tools and filters in professional public databases to find information to solve a real world problem.** Students will work in groups

to research copyright infringement cases and make connections to the ongoing changes being made within the music industry.

Interdisciplinary Connections

- Examination of the myriad cultures which have shaped different genres of music throughout our world (Social Studies).
- Students will be able to relate scale steps and chord progressions with mathematical equations and "if/then" statements. (Math & Computer Programming)
- Students will know how microphones, mixing consoles, speakers, and DAW software is used to record music. (physics)
- Students will know that sound is a vibration of air particles that travels in pressure waves. (physics)
- Students will know how the human ear works and be able to compare the process to microphones and speaker systems. (biology and physics)
- Students listen to music recorded on different formats from different time periods and see how the technology of the day shaped the music industry and songwriting trends. (History & Science)
- Students will compare musical phrases with sentence/paragraph structure. (Language Arts)

LGBTQ/Disabilities Resources

- Explore how famous musicians thrive with mental or physical disabilities.
    - Def Leppard drummer uses inspiring comeback to lift others: https://www.youtube.com/watch?v=HatF-AZWiHE
    - After becoming paralyzed from a ski accident, Dave Whalen invents the Jamboxx so that he can play music using only his breath. https://www.youtube.com/watch?v=xFVcPqlUy3M