

**Randolph Township Schools
Randolph High School
Music Technology I Curriculum**

*“I've always been fascinated with the juxtaposition of technology in music.
It's amazing the way you can apply technology to an art form.”
- Geoff Downes*

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Mission Statement

We commit to inspiring and empowering all students in Randolph schools to reach their full potential as unique, responsible and educated members of a global society.

**Affirmative Action Statement
Equality and Equity in Curriculum**

The Randolph Township School district ensures that the district's curriculum and instruction are aligned to the state's standards. The curriculum provides equity in instruction, educational programs and provides all students the opportunity to interact positively with others regardless of race, creed, color, national origin, ancestry, age, marital status, affectional or sexual orientation, gender, religion, disability or socioeconomic status.

N.J.A.C. 6A:7-1.7(b): Section 504, Rehabilitation Act of 1973; N.J.S.A. 10:5; Title IX, Education Amendments of 1972

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**EDUCATIONAL GOALS
VALUES IN EDUCATION**

The statements represent the beliefs and values regarding our educational system. Education is the key to self-actualization, which is realized through achievement and self-respect. We believe our entire system must not only represent these values, but also demonstrate them in all that we do as a school system.

We believe:

- The needs of the child come first
- Mutual respect and trust are the cornerstones of a learning community
- The learning community consists of students, educators, parents, administrators, educational support personnel, the community and Board of Education members
- A successful learning community communicates honestly and openly in a non-threatening environment
- Members of our learning community have different needs at different times. There is openness to the challenge of meeting those needs in professional and supportive ways
- Assessment of professionals (i.e., educators, administrators and educational support personnel) is a dynamic process that requires review and revision based on evolving research, practices and experiences
- Development of desired capabilities comes in stages and is achieved through hard work, reflection and ongoing growth

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Introduction

In the late nineteenth century, beginning with Thomas Edison’s invention of the phonograph, the development of electronic technology began a two-front revolution in music and the way people experience it. Prior to 1877, all musical sound had to be performed in the moment it was to be experienced. Following that performance, that musical moment existed only in the memories of those present – audience and performer. From the first instance of recorded musical sound, musicians and engineers have sought and developed better and better mediums of recorded sounds and methods for recording. The harnessing of electronic technology for musical purpose continued not only to record live sound, but also to create musical sound using technology. This course serves as an introduction to both applications – creating electronic music and recording live music.

“Music Technology is a broad term encompassing everything from microphones to saxophones. In fact, it’s difficult to find a musical activity that isn’t impacted by technology. In some circumstances, the technology is obvious, such as the use of a synthesizer performance by a pop musician or the use of microphones, mixers, and computers in the recording studio. However even “acoustic” musicians use technology every day. They might use music notation software to compose or arrange a work, a portable recorder to capture a rehearsal for later analysis, or audio and video editing software to create demos in order to get gigs.”

“Some musicians are concerned that making music with technology becomes about the technology rather than about the music. Strange as it sounds, the solution to this is a greater engagement with technology. We interact with the basic functions of hardware and software through an interface of some sort, whether the physical knobs and sliders of hardware or their virtual counterparts in software. Each of these interface controls represent an underlying process. In order to make the computer do what you want, you have to master the concepts that lie beneath the interface. Fundamental knowledge of music technology forms the basis for these analytical abilities. In this way, mastering the technology allows you to make it ‘all about the music.’”

- Dan Hosken, Professor of Music, California State University, Northridge

This full year course serves as the gateway to the magical world of Music Technology and is aligned to the NJ Visual and Performing Arts Core Curriculum Content Standards. Today’s world is one where technology dominates the landscape, and one has to look no further than the extremely accessible area of Music to see how central technology is to our existence. Music Technology teaches students the “nuts and bolts” of how technology influences music and allows them to learn in a hands-on environment how to create musical masterpieces of their own.

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Curriculum Pacing Chart

SUGGESTED TIME ALLOTMENT	UNIT NUMBER	CONTENT - UNIT OF STUDY
3 weeks	I	Introduction to Computers in Music
4 weeks	II	Form
5 weeks	III	Microphones and Audio Editing
Ongoing	Practical Concept I	Piano Keyboard Skills
5 weeks	IV	Music and Visual Media
Ongoing	Practical Concept II	Music Theory
5 weeks	V	Music Notation Software and Audio Editing
5 weeks	VI	Signal Processing
4 weeks	VII	Drum Machines
5 weeks	VIII	Synthesis in Analog and Digital Applications

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Unit I: Introduction to Computers in Music

STANDARDS / GOALS: <i>NJ Core Curriculum Content Standards - VPA</i>	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
1.2.8.A.1 - Map historical innovations in dance, music, theatre, and visual art that were caused by the creation of new technologies.	The computer is a useful and necessary tool for survival in today's world and has many practical applications within the musical world.	<ul style="list-style-type: none"> • How have composers and arrangers used computers to improve their craft? • In what ways does functionality inform application?
1.3.12.B.2 - Analyze how the elements of music are manipulated in original or prepared musical scores.	The use of computer software increase proficiency in musical performance.	<ul style="list-style-type: none"> • How can using and exploring digital audio workstations (DAWs) improve musical aptitude?
1.3.12.B.4 - Arrange simple pieces for voice or instrument using a variety of traditional and nontraditional sound sources or electronic media, and/or analyze prepared scores using music composition software.	Music technology evolves as the consumer and musical markets change with time.	<ul style="list-style-type: none"> • In what ways have companies such as Apple impacted music production and technology?
	<u>KNOWLEDGE</u> Students will know:	<u>SKILLS</u> Students will be able to:
1.4.8.B.1 - Evaluate the effectiveness of a work of art by differentiating between the artist's technical proficiency and the work's content or form.	The Mac OSX operating system differs in functionality of PC and iOS applications in such ways such as file organization, keyboard shortcuts, program opening and closing, and other aspects of design.	<p>Demonstrate efficient operation of hardware and software within the Mac OSX environment.</p> <p>Discuss computer functionality across hardware platforms.</p>

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Unit I: Introduction to Computers in Music

<p>1.4.12.B.2 - Evaluate how an artist’s technical proficiency may affect the creation or presentation of a work of art, as well as how the context in which a work is performed or shown may impact perceptions of its significance/meaning.</p>	<p>Improvements to computer technology including hardware and software happen on a frequent basis, which continually helps to advance the various technologies to help create authentic music creation.</p> <p>The Musical Instrument Digital Interface (MIDI) is computer protocol (language) and hardware standard developed to connect musical instruments and computers.</p> <p>A Digital Audio Workstation (DAW) is an application, software or hardware, in which the user creates (records or composes) or manipulates (edits or produces) digital music through the use of MIDI, live recording, and prerecorded digital and live music.</p> <p>In DAWs, a track is a single software or live instrument. A composition may comprise one or many tracks.</p>	<p>Compare and contrast the overall innovations that have occurred over time within music technology that has helped the composer.</p> <p>Consider the application of MIDI in studio music and live performance.</p> <p>Use transport (play, stop, etc.) and mixer controls to manipulate digital music.</p> <p>Listen to, edit, and manipulate single and multitrack music.</p> <p>Integrate key musical terminology when discussing and editing multitrack music.</p>
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Unit I: Introduction to Computers in Music

	<p>In DAWs, a loop is a live or MIDI recording, supplied by the program or created by the user, intended for use in compositions as a repeated musical idea.</p> <p>To produce is to balance (track against track) and mix (track against complete composition) the volumes, timbres, and textures within digital music. The producing process begins at the start of composition. Mastering is the application of global settings such as volume, pan, effects to the mostly completed composition.</p>	<p>Compose original compositions that include application of loops.</p> <p>Edit a complete musical composition to uniformly balance tracks.</p> <p>Examine and mix tracks against the entire product in a complete musical composition.</p> <p>Assess and master the complete musical composition.</p>
	<p>VOCABULARY: computer, user interface, operating system, musical keyboard, MIDI, DAW, timeline, transport controls, track, loop, volume, timbre, texture, balance, mix, master, produce, bar lines, velocity, meter, tempo</p>	

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Unit I: Introduction to Computers in Music

ASSESSMENT EVIDENCE: Students will show their learning by:

- Individually conferencing with teacher for student-based inquiry and to check on progress
- Completing a Free-form (no set structure) loop project in a DAW such as GarageBand
- Presenting projects to the class with peer-to-peer evaluation referencing a pre discussed rubric

KEY LEARNING EVENTS AND INSTRUCTION:

- Explore OSX through group discussion and demonstrations
- Participate in a teacher-led demonstration of the fundamentals of a DAW such as GarageBand
- Use newly acquired skills in a cumulative composition project, demonstrating mastery of the transport controls and user interface in the artistic application of loops
- Participate in a group discussion that focuses on the key technology innovations that has helped the creation of digital music flourish.
- Critically analyze projects (self and peers) using a pre discussed rubric

SUGGESTED TIME ALLOTMENT	3 Weeks
SUPPLEMENTAL UNIT RESOURCES	Music Technology Computer Workstation Unit I Project Checklist and Rubric Computer based applications such as GarageBand and Logic Pro Music Theory Lessons: www.musictheory.net Working with loops Garageband: https://www.youtube.com/watch?v=ZSWbYaT7O14

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Unit II: Form

STANDARDS / GOALS: <i>NJ Core Curriculum Content Standards - VPA</i>	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
<p>1.1.8.B.2 - Compare and contrast the use of structural forms and the manipulation of the elements of music in diverse styles and genres of musical compositions.</p> <p>1.1.12.B.2 - Synthesize knowledge of the elements of music in the deconstruction and performance of complex musical scores from diverse cultural contexts.</p>	<p>Tonal musical compositions contain many common organizing devices and structures.</p>	<ul style="list-style-type: none"> • Why would you focus on musical forms and syntax in order to lead to greater enjoyment and understanding of musical performance? • How does the understanding of common devices used to structure music relate to the overall field of music technology?
<p>1.3.12.B.2 - Analyze how the elements of music are manipulated in original or prepared musical scores.</p>	<p>Composers use form and syntax to organize musical ideas in a coherent fashion.</p>	<ul style="list-style-type: none"> • How can the roles of composer, arranger, and producer intersect? • How do producers and audio engineers form and syntax in their everyday jobs?
<p>1.3.12.B.4 - Arrange simple pieces for voice or instrument using a variety of traditional and nontraditional sound sources or electronic media, and/or analyze prepared scores using music composition software.</p>	<p><u>KNOWLEDGE</u> Students will know:</p>	<p><u>SKILLS</u> Students will be able to:</p>
	<p>Form refers to the structure of musical ideas, almost always including repeated themes.</p>	<p>Consider the form of musical literature while listening and following the timeline.</p>

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<p>1.4.8.A.7 - Analyze the form, function, craftsmanship, and originality of representative works of dance, music, theatre, and visual art.</p> <p>1.4.12.A.2 - Speculate on the artist's intent, using discipline-specific arts terminology and citing embedded clues to substantiate the hypothesis.</p> <p>1.4.8.B.2 - Differentiate among basic formal structures and technical proficiency of artists in works of dance, music, theatre, and visual art.</p>	<p>Binary form (AB) includes at least two distinct melodic ideas, often repeated in a specific order. Ternary form (ABA) is similar to binary form, with the first melodic section repeated in its entirety.</p> <p>Theme and Variation is a musical form in which a complete musical idea is repeated, with each repeat including alterations on the original idea without compromising the integrity and recognizability of the theme.</p> <p>An ostinato is a musical device in which an isolated rhythmic or melodic idea is repeated through one or more sections of a piece, if not the entire piece.</p>	<p>Describe the syntax of form as it applies to binary and ternary compositions while listening and following the timeline.</p> <p>Integrate binary and ternary forms as applicable in various composition projects throughout the course.</p> <p>Listen to a theme and discuss ways in which it could be modified in the DAW to create variations.</p> <p>While listening to music in a theme and variations form, describe what melodic, harmonic, textural, or timbral devices the composer used to create variations.</p> <p>Use theme and variation form as applicable in at least one composition project during this course.</p> <p>Identify and recognize ostinatos in the timeline and aurally.</p>
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	<p>Arch (ABCBA) and rondo (ABACA[BA]) forms are common structures that expand upon the tonal language of binary and ternary forms, adding a third distinct section.</p>	<p>Apply ostinatos in the creation and production of at least one composition project during this course.</p> <p>Classify musical compositions by form while listening and/or following the timeline.</p> <p>Utilize arch or rondo forms in composition projects during this course.</p>
	<p>VOCABULARY: theme/motif, phrase, section, repetition, binary form, ternary form, rondo, ostinato, chaconne, ground bass</p>	

ASSESSMENT EVIDENCE: Students will show their learning by:

- Individually conferencing with teacher to check in on the formal structures of project that students will be working from
- Constructing a loop-based set-form composition project in a DAW such as GarageBand
- Exhibiting their projects to the class with peers evaluating the formal structure by answering guiding questions

KEY LEARNING EVENTS AND INSTRUCTION:

- Evaluate melodies in a class discussion, applying critique parameters such as contour, interest, and conjunctiveness
- Discover repetition and form in a listening-based class discussion
- Apply their newly acquired skills in a cumulative composition project, properly applying formal structures with clarity
- Participate in a gallery walk through each other's projects
- Critically analyze projects (self and peers) using guiding questions

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SUGGESTED TIME ALLOTMENT	4 Weeks
SUPPLEMENTAL UNIT RESOURCES	Music Technology Computer Workstation Unit II Project Checklist and Rubric Computer based applications such as GarageBand and Logic Pro www.musictheory.net www.padlet.com

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Unit III: Digital Audio Editing and Microphones

STANDARDS / GOALS: <i>NJ Core Curriculum Content Standards - VPA</i>	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
1.1.12.B.2 - Synthesize knowledge of the elements of music in the deconstruction and performance of complex musical scores from diverse cultural contexts.	The microphone is the transforming link between the world of acoustic sound and the world of electrical audio signals.	<ul style="list-style-type: none"> • Why do we need microphones?
1.2.8.A.2 - Differentiate past and contemporary works of dance, music, theatre, and visual art that represent important ideas, issues, and events that are chronicled in the histories of diverse cultures.	The quality and selection of microphones and competency of the user make an extremely significant impact on the quality of the performance and/or recording.	<ul style="list-style-type: none"> • How does microphone choice affect the transmission of the music?
1.2.12.A.2 - Justify the impact of innovations in the arts (e.g., the availability of music online) on societal norms and habits of mind in various historical eras.	Audio editing is to music as proofreading and editing is to text-based media.	<ul style="list-style-type: none"> • Why is the audio editing process crucial to the artistic and commercial viability of the final product?
1.3.8.B.1 - Perform instrumental or vocal compositions using complex standard and non-standard Western, non-Western, and avant-garde notation.	<u>KNOWLEDGE</u> Students will know:	SKILLS Students will be able to:
	Rhythmic notation is a system of standardized ideograms based on fractions.	Listen, read, and transcribe in rhythmic notation. Compose music considering appropriate rhythm in the western musical tradition.

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Unit III: Digital Audio Editing and Microphones

<p>1.3.12.B.2 - Analyze how the elements of music are manipulated in original or prepared musical scores.</p> <p>1.3.12.B.3 - Improvise works through the conscious manipulation of the elements of music, using a variety of traditional and nontraditional sound sources, including electronic sound-generating equipment and music generation programs.</p> <p>1.3.12.B.4 - Arrange simple pieces for voice or instrument using a variety of traditional and nontraditional sound sources or electronic media, and/or analyze prepared scores using music composition software.</p> <p>1.4.8.A.1 - Generate observational and emotional responses to diverse culturally and historically specific works of dance, music, theatre, and visual art.</p>	<p>Producers and engineers use the tools built into DAWs such as GarageBand to edit live audio and digital mediums such as MIDI data.</p> <p>Quantization is the digital process of matching live performance to the rhythmic structure built into the timeline.</p> <p>Microphones can be categorized into two basic operational technologies – dynamic and condenser.</p> <p>Microphones are used in two basic applications – recording and live sound reinforcement.</p>	<p>Synthesize, evaluate, and edit audio and musical data in a DAW.</p> <p>Assess midi data from live performance to determine if quantization is needed.</p> <p>Decide what level of quantization best fits the data.</p> <p>Successfully apply quantization to projects as needed.</p> <p>Categorize microphones based on their underlying technologies.</p> <p>Identify and select microphones appropriately based on their function and the environment in which they will be used.</p>
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Unit III: Digital Audio Editing and Microphones

<p>1.4.8.A.2 - Identify works of dance, music, theatre, and visual art that are used for utilitarian and non-utilitarian purposes.</p> <p>1.4.8.A.3 - Distinguish among artistic styles, trends, and movements in dance, music, theatre, and visual art within diverse cultures and historical eras.</p> <p>1.4.8.A.7 - Analyze the form, function, craftsmanship, and originality of representative works of dance, music, theatre, and visual art.</p>	<p>Microphones operate (pick-up sound) in specific polar patterns.</p> <p>In computer applications and before recording, microphones must be set-up and integrated with a DAW.</p>	<p>Decide and recommend microphones based on their technical properties and polar patterns for specific applications.</p> <p>Connect various types of microphones to a DAW and record audio.</p> <p>Integrate the use of a microphone within a DAW.</p> <p>Edit audio in a DAW sourced from a microphone.</p>
<p>1.4.12.A.2 - Speculate on the artist’s intent, using discipline-specific arts terminology and citing embedded clues to substantiate the hypothesis.</p> <p>1.4.12.B.1 - Formulate criteria for arts evaluation using the principles of positive critique and observation of the elements of art and principles of design, and use the criteria to evaluate works of dance, music, theatre, visual, and multimedia artwork from diverse cultural contexts and historical eras.</p>	<p>VOCABULARY: rhythmic notation, transcribe, western music, live audio, MIDI data, quantization, microphone, sound reinforcement, polar patterns, directional, omni-directional, electrical signals, transducer, frequency response, sensitivity, interface</p>	

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Unit III: Digital Audio Editing and Microphones

ASSESSMENT EVIDENCE: Students will show their learning by:

- Individually conferencing with the teacher to check on progress and showing examples of audio editing applied to each students' project
- Building a complete musical project with teacher-supplied audio source, demonstrating proficiency with the audio editing tools in a DAW such as GarageBand
- Participating in peer-to-peer evaluation analyzing with a checklist (an electronic system such as MS365 Fill or Plickers is suggested)

KEY LEARNING EVENTS AND INSTRUCTION:

- Discuss microphones and the application of different technologies such as dynamic vs. condenser and USB vs. XLR connectors
- Apply their newly acquired audio editing skills in a cumulative project in a DAW such as GarageBand
- Participate in a presentation of their cumulative project to their classmates
- Participate in a gallery walk through each other's projects
- Critically analyze projects (self and peers) with a checklist

SUGGESTED TIME ALLOTMENT

5 Weeks

SUPPLEMENTAL UNIT RESOURCES

Music Technology Computer Workstation
 Unit III Project Checklist and Rubric
 Computer based applications such as GarageBand and Logic Pro
 Various microphones
 Lynda.com: <https://www.lynda.com/Audio-Music-tutorials/GarageBand/598483/630147-4.html>
www.musictheory.net, www.padlet.com
 Teacher-created Resources, possibly including but not limited to rubrics, vocabulary worksheets, and project templates.

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Practical Concept I: Piano Keyboard Skills

STANDARDS / GOALS: <i>NJ Core Curriculum Content Standards - VPA</i>	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
1.1.12.B.1 - Examine how aspects of meter, rhythm, tonality, intervals, chords, and harmonic progressions are organized and manipulated to establish unity and variety in genres of musical compositions.	The piano keyboard represents a complete visualization and kinesthetic map of musical pitch.	<ul style="list-style-type: none"> • How do piano keyboard skills benefit composers and audio editors? • Why is the piano considered to be a gateway instrument for the study and appreciation of music?
1.1.12.B.2 - Synthesize knowledge of the elements of music in the deconstruction and performance of complex musical scores from diverse cultural contexts.	The MIDI keyboard is a crucial element of a music technology workstation.	<ul style="list-style-type: none"> • Why would an audio engineer and composer choose to use a MIDI keyboard?
1.3.8.B.1 - Perform instrumental or vocal compositions using complex standard and non-standard Western, non-Western, and avant-garde notation.	<u>KNOWLEDGE</u> Students will know:	SKILLS Students will be able to:
	<p>The layout of the piano keyboard integrates the musical alphabet in a physical device.</p> <p>Music symbols and terminology relate to piano performance such as notes, durational symbols, and dynamics.</p>	<p>Demonstrate an understanding of the piano keyboard through discussion and playing.</p> <p>Perform simple five note melodies with an accompanying chord progression.</p> <p>Read notation in both the treble and bass clefs.</p>

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	<p>The fundamentals of effective finger technique are built of patterns common to music such as arpeggios, scales, etc.</p> <p>Rhythmic notation applies to piano in the same manner as it applies to the timeline in a DAW.</p>	<p>Plan and implement finger technique in practice.</p> <p>Execute rhythmic notation in performance on the piano in simple meter.</p>
	<p>VOCABULARY:</p> <p>piano & MIDI keyboard, musical alphabet, notation, timeline, clef, meter, range, pitch, scale, arpeggio, melodies, chord progression, audio engineers, composers</p>	
<p>ASSESSMENT EVIDENCE: Students will show their learning by:</p> <ul style="list-style-type: none"> • Individual student/teacher conferencing to check on posture, hand carry, finger technique, and musical accuracy • Recording into a DAW using a MIDI keyboard in real time to create a portfolio demonstrating measurable growth in piano proficiency <p>KEY LEARNING EVENTS AND INSTRUCTION:</p> <ul style="list-style-type: none"> • Following a graduated method to build basic skills at a MIDI keyboard • Critically self-analyzing recordings in a DAW using given questions in an electronic journal through software such as MS Teams 		
<p>SUGGESTED TIME ALLOTMENT</p>	<p>Ongoing after completion of Unit III</p>	
<p>SUPPLEMENTAL UNIT RESOURCES</p>	<p>Music Technology Computer Workstation</p> <p>Computer based applications such as GarageBand</p> <p>GarageBand Piano Lessons</p> <p>Learn to Play Piano on Garageband: https://www.youtube.com/watch?v=9HAarkWJLXo</p> <p>www.musictheory.net</p>	

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Unit IV: Music and Visual Media

STANDARDS / GOALS: <i>NJ Core Curriculum Content Standards - VPA</i>	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
1.1.12.B.2 - Synthesize knowledge of the elements of music in the deconstruction and performance of complex musical scores from diverse cultural contexts.	Since the dawn of the film age, music has been an integral part of video media.	<ul style="list-style-type: none"> • How did the film music medium evolve?
1.2.12.A.2 - Justify the impact of innovations in the arts (e.g., the availability of music online) on societal norms and habits of mind in various historical eras.	Music in video media performs specific artistic, dramatic, and commercial purposes.	<ul style="list-style-type: none"> • How has music impacted video media?
	<u>KNOWLEDGE</u> Students will know:	<u>SKILLS</u> Students will be able to:
1.3.12.B.4 - Arrange simple pieces for voice or instrument using a variety of traditional and nontraditional sound sources or electronic media, and/or analyze prepared scores using music composition software.	Hit points are moments identified by the creative team acknowledged by the film score by way of change, dynamic, timbre, or texture.	Point out and describe various hit points throughout listening exercises.
1.4.8.A.7 - Analyze the form, function, craftsmanship, and originality of representative works of dance, music, theatre, and visual art.	Syncing, also known as film spotting, is the process of matching the timing and emotional content of the music with the timing and emotional content of the video.	Analyze film scores, discussing the syncing of the video's plot and the musical content.

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	A film or video's composer creates the musical score that accompanies the video.	Develop music in a DAW intended to accompany a video.
	The music editor is a member of a film's creative team responsible for keeping the music in sync with the picture.	Appraise, edit, and integrate the video and music into a coherent and complete media product.
	VOCABULARY: spotting, film score, start marker, end marker, hit markers, descriptive markers, Foley sounds, Foley artists	

ASSESSMENT EVIDENCE: Students will show their learning by:

- Conferencing with teacher to demonstrate proficiency with lining up music and visual media in a DAW such as GarageBand
- Designing Foley sound effects to accompany teacher-supplied video segments
- Creating original music to accompany video in a film scoring project
- Student presentations of film scores and peer-to-peer evaluations of film scores utilizing the complete rubric (It is suggested that each student critique three projects, including their own, and that the teacher randomly assign evaluations to ensure that each project is evaluated an equal number of times)

KEY LEARNING EVENTS AND INSTRUCTION:

- Evaluate and analyze video media, discussing the musical component using questions from the project rubric
- Generate and apply Foley sounds in the editing of (a) teacher-supplied video(s)
- Create and edit music to accompany (a) teacher-supplied video(s) and integrate the music and video
- Participate in a gallery walk through each other's projects, providing feedback evaluating one or more rubric qualities on each video
- Critically analyze projects (self and peers) using the complete project rubric (see note above in Assessment evidence)

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SUGGESTED TIME ALLOTMENT	5 Weeks
SUPPLEMENTAL UNIT RESOURCES	Music Technology Computer Workstation Unit IV Project Checklist and Rubric Computer based applications such as GarageBand and Logic Pro www.musictheory.net Foley sound materials such as buckets, coconuts, and keys.

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Practical Concept II: Music Theory

STANDARDS / GOALS: <i>NJ Core Curriculum Content Standards - VPA</i>	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
<p>1.1.8.B.1 - Analyze the application of the elements of music in diverse Western and non-Western musical works from different historical eras using active listening and by reading and interpreting written scores.</p>	<p>Harmony is to music as grammar is to language.</p>	<ul style="list-style-type: none"> • How is grammar analogous to harmony?
<p>1.1.8.B.2 - Compare and contrast the use of structural forms and the manipulation of the elements of music in diverse styles and genres of musical compositions.</p>	<p>Audio engineers and producers must be able to read and understand sheet music.</p>	<ul style="list-style-type: none"> • How do audio engineers and producers interact with sheet music?
<p>1.1.12.B.1 - Examine how aspects of meter, rhythm, tonality, intervals, chords, and harmonic progressions are organized and manipulated to establish unity and variety in genres of musical compositions.</p>	<p>An understanding of functional harmony can be applied to audio editing.</p>	<ul style="list-style-type: none"> • How does harmony inform the overall emotional impact and effectiveness of music?
	<p><u>KNOWLEDGE</u> Students will know:</p>	<p><u>SKILLS</u> Students will be able to:</p>
	<p>The staff is a dot graph in which frequency (pitch) is notated on the Y axis and time (rhythm) travels from left to right on the X axis.</p> <p>Music has a melodic and harmonic vocabulary that musicians can use to recognize and apply common patterns.</p>	<p>Read, write, and transcribe music in treble and bass clef.</p> <p>Recognize and describe common melodic and harmonic patterns.</p>

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Practical Concept II: Music Theory

<p>1.3.12.B.1 - Analyze compositions from different world cultures and genres with respect to technique, musicality, and stylistic nuance, and/or perform excerpts with technical accuracy, appropriate musicality, and the relevant stylistic nuance.</p> <p>1.3.12.B.2 - Analyze how the elements of music are manipulated in original or prepared musical scores.</p> <p>1.4.8.A.7 - Analyze the form, function, craftsmanship, and originality of representative works of dance, music, theatre, and visual art.</p>	<p>Rhythm is recorded using a system note values based on fractions.</p> <p>Tonality refers to the specific family of tones used in a composition.</p> <p>Intervals describe the difference in frequency between two pitches.</p> <p>Chords are groups of usually three, but at least two or more pitches that can often be applied in tonality to have specific functions in harmonic progression.</p>	<p>Produce sheet music and sound using rhythmic notation (note values and time signature/measure structure).</p> <p>Describe and create music using key signatures in major, minor, and modal tonalities.</p> <p>Categorize melodic and harmonic intervals by quantity and quality.</p> <p>Differentiate between major and minor chords.</p> <p>Discuss primary chords (I (i), IV (iv), and V) and their function in major, minor, and modal tonalities.</p> <p>Construct simple chord progressions using primary chords.</p>
	<p>VOCABULARY: sheet music, staff, grand staff, pitch, enharmonic notes, clef, ledger lines, key signature, rhythm, note values, time signature, measure, bar line, scales, intervals, chord, primary chords, harmony, tonality</p>	

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Practical Concept II: Music Theory

ASSESSMENT EVIDENCE: Students will show their learning by:

- Completing checkpoints through the year in the form of quizzes or similar on each concept (it is suggested to use an online system such as www.musictheory.net)
- Applying music theory concepts in the design of DAW projects

KEY LEARNING EVENTS AND INSTRUCTION:

- Discuss the elements of music theory as their application relates to music they are listening to, reading in a timeline, or composing
- Describe the elements of music theory in interaction with software
- Use internet-based music theory tutors (as available) to practice their music theory skills with real-time feedback

SUGGESTED TIME ALLOTMENT	Ongoing after completion of Unit IV
SUPPLEMENTAL UNIT RESOURCES	Music Technology Computer Workstation Computer based applications such as GarageBand and Logic Pro www.musictheory.net

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Unit V: Music Notation Software and Audio Editing

STANDARDS / GOALS: <i>NJ Core Curriculum Content Standards - VPA</i>	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
<p>1.1.12.B.1 - Examine how aspects of meter, rhythm, tonality, intervals, chords, and harmonic progressions are organized and manipulated to establish unity and variety in genres of musical compositions.</p>	<p>Music notation software is to sheet music as Microsoft Word is text.</p>	<ul style="list-style-type: none"> • How do composers, audio engineers, and producers use music notation software to enhance their musical vision?
<p>1.3.12.B.2 - Analyze how the elements of music are manipulated in original or prepared musical scores.</p>	<p>In the twenty-first century, all printed sheet music begins in music notation software.</p>	<ul style="list-style-type: none"> • In what ways has electronic music notation changed the music industry?
<p>1.3.12.B.4 - Arrange simple pieces for voice or instrument using a variety of traditional and nontraditional sound sources or electronic media, and/or analyze prepared scores using music composition software.</p> <p>1.4.8.A.7 - Analyze the form, function, craftsmanship, and originality of representative works of dance, music, theatre, and visual art.</p>	<p style="text-align: center;"><u>KNOWLEDGE</u> Students will know:</p> <p>Composers, arrangers, musicians, and audio engineers can create sheet music from scratch using music notation software.</p> <p>Music notation software contains new families of tools such as key signatures, tuplets, and untimed MIDI pitch entry that allow users to interact with every aspect of the final printed sheet music.</p>	<p style="text-align: center;">SKILLS Students will be able to:</p> <p>Transcribe sheet music using a music notation program.</p> <p>Apply music theory concepts such as pitch, rhythmic notation, intervals, and chords in the use of music notation software.</p> <p>Demonstrate proficiency of with the user interface of a music notation DAW in the creation and transcription of sheet music.</p>

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Unit V: Music Notation Software and Audio Editing

	<p>MIDI data can be imported into a music notation software and then reformatted for printing.</p> <p>Any music notation software program is a highly-specialized DAW designed to interact not only with MIDI, but also with formatted, publishable sheet music.</p>	<p>Examine tools and tool palettes to find solutions to problems in transcription possibility including measure and system spacing, enharmonic pitch selection, and rhythmic precision.</p> <p>Import *.midi files into music notation software and format for printing.</p> <p>Employ music notation software to create sheet music.</p> <p>Export sheet music as MIDI data for import into other DAWs.</p>
	<p>VOCABULARY: music notation, MIDI data, *.mid, quantization</p>	

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Unit V: Music Notation Software and Audio Editing

ASSESSMENT EVIDENCE: Students will show their learning by:

- Individual student/teacher conferencing, discussing progress and finding solutions to transcription issues
- Producing sheet music in a transcription project from a teacher-supplied melody
- Constructing a publishable audio project, incorporating original music exported from music notation software, into another DAW
- Peer evaluation of original music, examining aspects of tonality and melodic contour

KEY LEARNING EVENTS AND INSTRUCTION:

- Explore a second DAW such as Finale that incorporates music notation software
- Transcribe sheet music using music notation software from teacher-supplied music
- Import MIDI data from another DAW such as GarageBand for modification and formatting in music notation software
- Export MIDI data from music notation software for use in another DAW such as GarageBand and utilize that MIDI data in a cumulative audio editing project
- Participate in a gallery walk of their projects
- Present cumulative audio editing projects to the class with peers evaluating based on aspects of tonality and melody

SUGGESTED TIME ALLOTMENT	5 Weeks
SUPPLEMENTAL UNIT RESOURCES	Music Technology Computer Workstation Transcription Project Checklist and Rubric Unit V Project Checklist and Rubric Computer based applications such as Finale, GarageBand and Logic Pro usermanuals.finalemusic.com/FinaleMac/Content/Finale/Quick_Start_Videos.htm www.musictheory.net Teacher supplied sheet music for transcription

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Unit VI: Signal Processing

STANDARDS / GOALS: <i>NJ Core Curriculum Content Standards - VPA</i>	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
1.2.12.A.2 - Justify the impact of innovations in the arts (e.g., the availability of music online) on societal norms and habits of mind in various historical eras.	DAWs, such as Reason, Logic, and Mainstage, are designed to reflect physical studio builds.	<ul style="list-style-type: none"> • Why would an artist choose to use a software layout in a DAW rather than a physical studio setup?
1.3.12.B.4 - Arrange simple pieces for voice or instrument using a variety of traditional and nontraditional sound sources or electronic media, and/or analyze prepared scores using music composition software.	DAWs seek to integrate every acoustic and electronic instrument in a digital reproduction.	<ul style="list-style-type: none"> • How do DAWs reproduce different instruments in an authentic manner?
1.4.8.A.7 - Analyze the form, function, craftsmanship, and originality of representative works of dance, music, theatre, and visual art.	Audio effects are designed to mimic the impact of architectural or mechanical elements.	<ul style="list-style-type: none"> • How can audio effects manipulate sound to translate acoustic effects?
1.4.8.A.7 - Analyze the form, function, craftsmanship, and originality of representative works of dance, music, theatre, and visual art.	<u>KNOWLEDGE</u> Students will know:	SKILLS Students will be able to:
1.4.8.B.2 - Differentiate among basic formal structures and technical proficiency of artists in works of dance, music, theatre, and visual art.	Different DAWs have different user interfaces that include many of the same elements.	<p>Explore a third DAW such as Reason, comparing its user interface and technical capabilities with other DAWs previously studied in this course.</p> <p>Interact with the transport controls, sequencer, and mixer to modify and create digital audio in a third DAW such as Reason.</p>

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Unit VI: Signal Processing

	<p>Modular rack units digitally reproduce the physical arrangement and functionality of a studio build.</p> <p>Many DAWs have one or more loop machines and browsers built-in, often unique to the individual software title, such as the Dr. Octorex rack module in Reason.</p>	<p>Relate digital modular rack units to their physical counterparts applicable to studio builds.</p> <p>Produce digital music incorporating digital sound sources and audio effects from modular rack units.</p> <p>Apply the loop machines and browsers in different programs, contrasting their interfaces and advantages.</p> <p>Use the loop machine in the third DAW to create original music.</p>
	<p>VOCABULARY: Signal Processing, Reason, Logic, studio setup, audio effects, instrument and audio effect modules, mixer</p>	

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Unit VI: Signal Processing

ASSESSMENT EVIDENCE: Students will show their learning by:

- Teacher conferencing at a few stages throughout the composition project
- Composing original music in a DAW that has modular rack units, incorporating new music created in music notation software
- Presenting composition projects to the class and assessing peer work using a teacher-supplied question

KEY LEARNING EVENTS AND INSTRUCTION:

- Explore a third DAW such as Reason or Logic, applying previously acquired knowledge of user interface, transport controls, and other elements
- Create original music using a DAW that has modular rack units such as Reason or Logic
- Participate in a gallery walk of their projects
- Present composition projects to the class and complete peer-to-peer assessment using a teacher-supplied question such as “In twenty words or fewer, describe the application of a modular rack unit in this composition”

SUGGESTED TIME ALLOTMENT

5 weeks

SUPPLEMENTAL UNIT RESOURCES

Music Technology Computer Workstation
 Unit V Project Checklist and Rubric
 Computer based applications such as Reason, GarageBand and Logic Pro
 www.musictheory.net
 What is Reason? https://www.youtube.com/watch?v=Fpx_LvSB2_Q

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Unit VII: Drum Machines

STANDARDS / GOALS: <i>NJ Core Curriculum Content Standards - VPA</i>	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
1.1.8.B.2 - Compare and contrast the use of structural forms and the manipulation of the elements of music in diverse styles and genres of musical compositions.	Software drum machines are integrated in many practical settings within the music industry.	<ul style="list-style-type: none"> • Why would an artist choose to employ a drum machine rather than other electronics?
1.1.12.B.1 - Examine how aspects of meter, rhythm, tonality, intervals, chords, and harmonic progressions are organized and manipulated to establish unity and variety in genres of musical compositions.	Drum machines can perform with rhythmic complexity beyond that of a single human performer.	<ul style="list-style-type: none"> • In what ways have drum machines influenced the evolution of 21st century percussion writing?
1.3.12.B.4 - Arrange simple pieces for voice or instrument using a variety of traditional and nontraditional sound sources or electronic media, and/or analyze prepared scores using music composition software.	<u>KNOWLEDGE</u> Students will know:	SKILLS Students will be able to:
1.4.12.A.2 - Speculate on the artist’s intent, using discipline-specific arts terminology and citing embedded clues to substantiate the hypothesis.	The stylistic aspects of drum patterns such as rhythm, instrument choice, and articulation apply within specific groupings known as genres and styles.	Categorize grooves by genre and style.
	Software drum machines recreate all the capabilities of the drummer through MIDI mapping.	Create percussion patterns and grooves in a drum machine.
	Drum machines can be used to program custom loops and non-looped percussion lines.	Explore the drum machine, examining elements such as timbres, articulation, velocity.

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Unit VII: Drum Machines

	<p>Audio engineers incorporate custom drum programming into original and arranged digital music.</p> <p>An artist would specifically consider using a drum machine to get a certain sound or style that is needed for their creation.</p>	<p>Synthesize original drum loops, grooves, and non-looping lines.</p> <p>Compose original music and arrangements using custom drum programming.</p> <p>Compare and contrast an artist's intent in using a drum machine vs. using a live instrument.</p>
	<p>VOCABULARY: drum machines, MIDI mapping, percussion patterns and grooves, non-looped percussion lines, fills, dynamics, articulations, effects, reverb</p>	

ASSESSMENT EVIDENCE: Students will show their learning by:

- Teacher conferencing to provide feedback on composition in progress
- Constructing a musical composition, incorporating original music, and including a modified drum groove
- Evaluating self and peers using the project checklist

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Unit VII: Drum Machines

KEY LEARNING EVENTS AND INSTRUCTION:	
<ul style="list-style-type: none"> • Explore software drum machines in a DAW such as Reason • Create a musical composition incorporating original and/or arranged drum mapping • Apply (a) digital effect(s), including reverb, to their projects • Participate in a gallery walk of their projects • Present cumulative projects to the class and evaluate self and peers using a project checklist 	
SUGGESTED TIME ALLOTMENT	4 Weeks
SUPPLEMENTAL UNIT RESOURCES	Music Technology Computer Workstation Unit VII Project Checklist and Rubric Computer based applications such as Reason, GarageBand and Logic Pro www.musictheory.net drumbit.app

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Unit VIII: Synthesis in Analog and Digital Applications

STANDARDS / GOALS: <i>NJ Core Curriculum Content Standards - VPA</i>	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
<p>1.1.12.B.1 - Examine how aspects of meter, rhythm, tonality, intervals, chords, and harmonic progressions are organized and manipulated to establish unity and variety in genres of musical compositions.</p>	<p>The earliest electronic music sounds were created using additive and subtractive synthesis.</p>	<ul style="list-style-type: none"> • Why would audio engineers choose to create new timbres using synthesizers?
<p>1.1.12.B.2 - Synthesize knowledge of the elements of music in the deconstruction and performance of complex musical scores from diverse cultural contexts.</p>	<p>The foundation of electronic music can be summarized in the four basic wave forms: sine, square, sawtooth, and triangle.</p>	<ul style="list-style-type: none"> • In what ways have new timbres been derived from the basic wave forms?
<p>1.2.12.A.2 - Justify the impact of innovations in the arts (e.g., the availability of music online) on societal norms and habits of mind in various historical eras.</p> <p>1.3.12.B.4 - Arrange simple pieces for voice or instrument using a variety of traditional and nontraditional sound sources or electronic media, and/or analyze prepared scores using music composition software.</p>	<p><u>KNOWLEDGE</u> Students will know:</p>	<p>SKILLS Students will be able to:</p>
	<p>Sound waves can be generated in a pure form known as sine waves.</p>	<p>Aurally identify sine waves.</p> <p>Label sine waves in a DAW.</p>
	<p>Synthesis is the manipulation of sound waves to create new timbres.</p> <p>Common synthesized waveforms include but are not limited to saw waves, square waves, and triangle waves.</p>	<p>Modify sound waves using the tools available in a DAW.</p> <p>Name common wave forms by ear.</p> <p>Identify common wave forms when viewed in a DAW.</p>

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Unit VIII: Synthesis in Analog and Digital Applications

	<p>Filters are used to modify the sound being generated by a synthesizer.</p>	<p>Compose and arrange music in a DAW that includes common waveforms.</p> <p>Apply filters to adjust audio in both the synthesizer instrument and the timeline.</p>
	<p>VOCABULARY: additive and subtractive synthesis, basic wave forms, timbres, attack, decay, sustain, release</p>	

ASSESSMENT EVIDENCE: Students will show their learning by:

- Teacher feedback throughout the project
- Composing a synthesis project which includes previously studied elements as well as those introduced in this unit
- Evaluating self and peers using the project rubric

KEY LEARNING EVENTS AND INSTRUCTION:

- Explore waveforms aurally and visually
- Create original sound instruments using synthesis
- Incorporate original sounds into their projects
- Participate in a gallery walk of their projects

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Unit VIII: Synthesis in Analog and Digital Applications

SUGGESTED TIME ALLOTMENT	5 weeks
SUPPLEMENTAL UNIT RESOURCES	Music Technology Computer Workstation Computer based applications such as Reason, GarageBand and Logic Pro www.musictheory.net Teacher-created Resources, possibly including but not limited vocabulary worksheets and quizzes.