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by Seth Pendergast

Creative Music-Making with Digital Audio Workstations

Abstract: Interest in creative music technologies is on the rise among secondary students. Still, some music teachers are unsure how to integrate creative music technologies into their instruction. This article explores one versatile and powerful technology for the music classroom: digital audio workstations (DAWs). First, I discuss the central role of hyphenated musicianship in DAW-based music-making. Second, I explore a guiding framework for DAW-based creative projects in the music classroom. Third, I outline three initial projects for free or low-cost DAWs, each addressing fundamental musical, creative, and technological concepts for DAW-based music-making. The ideas and projects described in this article offer a practical pathway toward introductory DAW-based competencies and pedagogy, especially for music teachers inexperienced with DAW technologies.

Keywords: composition, creativity, DAW, digital audio workstation, music-making, music technology

Are you considering some creative musical projects with digital audio workstations? Here is a way to think about curriculum and project organization and a few project ideas.



Photo of Seth Pendergast is courtesy of the author.

Creative music technologies are gaining popularity among secondary music teachers[1] and students.[2] These teachers and young artists use computers or tablet-based apps to create music compositions and multimedia projects like podcasts, songs, film scores, tracks for live performance, ensemble compositions, remixes, and cover songs. One of the most fundamental and flexible tools for facilitating these innovative musical works is the digital audio workstation (DAW). Undoubtedly, many readers are already familiar with DAWs like GarageBand, Audacity, or Logic Pro. In general, most DAWs can record, edit, and mix sound; contain many prerecorded loops; and include a wide variety of virtual instruments and effects. Beyond their power and flexibility, DAWs are also more accessible, less expensive, and easier to use than they have ever been. For example, many affordable and user-friendly DAWs now operate entirely within a computer's web browser (e.g., Soundtrap, Soundation, BandLab).

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In the last several decades, DAW-based music production has blurred the lines between the traditional roles of music professionals. Unlike the analog studios of the past—where musicians, arrangers, producers, and sound engineers represented separate roles—DAWs enable one individual to occupy multiple roles. Although specialist arrangers, performers, and producers remain today, we have witnessed a dramatic rise in solo, do-it-yourself (DIY) DAW-based home recording in the last two decades.[3] The technological and personnel requirements of once large analog recording studios can now be replicated and expanded with one person operating a DAW on a laptop or even a mobile device.[4] Some scholars refer to these DIY individuals as *hyphenated musicians* because their musical skills defy categorization—for example, performer-composer-arranger-producer-engineer.[5] Moreover, this movement is not small or insignificant. DIY recording represents a range of hyphenated musicians that includes amateur artists, pop stars like Billie Eilish and her collaborator/brother Finneas, and rapper/producer collaborators like Pusha T, Kanye West, and Pharrell Williams.[6] This trend holds true in school environments as well, with recent surveys showing that students inside and outside school music classes are interested in DAW-based music-making.[7]

Some pedagogues see a unique opportunity in the concept of hyphenated musicianship and recommend a hybrid approach to musical instruction that encourages students to occupy the multiple roles of hyphenated musicians. A hybrid approach to music education will include explicit instruction in specific domains (e.g., performing, composing, improvising, technology) and ample opportunity to exercise a combination of these musical roles through meaningful creative endeavors.[8] Although hybrid approaches to music education are possible in nearly every classroom setting, DAW-based music-making can represent a natural opportunity for students to cultivate the expansive and multifaceted musicianship characteristic of hyphenated musicians.[9]

Despite the pedagogical and musical opportunities that DAWs present, many music educators feel ill-equipped to operate DAWs or facilitate DAW-based music instruction.[10] Therefore, the purpose of this article is to provide an introductory and hands-on guide to DAW-based music-making in the classroom. First, I discuss DAW-based instruction in the music classroom rooted in the creative process and hyphenated musicianship. Second, I explore a guiding framework for DAW-based creative projects in the music classroom. Next, I present three introductory projects designed according to these pedagogical frameworks and a list of curricular resources for DAW-based music instruction (see Table 1).

A Guiding Framework for DAW-Based Music-Making: Webster's Model of Creative Thinking in Music

Fundamentally, DAW-based music instruction is rooted in the creative process. The ultimate aim in most DAW-based classrooms is to develop some sort of creative product (e.g., arrangements, remixes, songs). Most teachers take a project-based approach where students define their creative goals, learn and leverage skills toward meeting those goals, and refine solutions over time. Typically, these projects occur in a sequence where musical skills and understandings gradually build on each other with each project, thereby encouraging student growth and expression. As you and your students experiment with DAW-based music-making, consider using Peter R. Webster's Model of Creative Thinking in Music to organize and facilitate each project (see Figure 1).[11]

Start with the Product Intention

Webster suggests that the preliminary step to the creative thinking process is to define the product intention. In other words, the project designer determines the ultimate creative product at the outset (see Figure 1). Although specific example projects may be found at the end of this article, here are a few ideas to keep in mind as you choose or design DAW-based projects for your students.

Inspiring Projects Matter

First, it is essential to keep students' interests, motivations, cultures, and personalities in mind. Projects should feel relevant, purposeful, and related to students' creative interests. Embodied in the project itself is the drive to create the product, so choose carefully. Furthermore, use points of inspiration to deepen students' connections to the work.[12] Examples might include personal experience, mood, other art forms, or even imagining a specific audience for the final product (e.g., friends, grandparents, dance).

Projects Can Be Large or Small

Not all projects need to be complete songs, compositions, or multimedia products. Some projects explore specific concepts or skills in preparation for a larger project. For example, consider the projects at the end of this article. Project 1 (Arranging with Loops) is a small project that introduces the DAW software, the musical element of form, and how composers think about form. The students apply these concepts in Project 2 (The Podcast)—a lengthier project that better resembles a finished product. Furthermore, Project 3 (Beat and Melody) is a small project designed to prepare students for more complex efforts in the future, like beat-making, melody writing, sampling, or film scoring.

Design Projects for Hyphenated Musicians

As you choose or design projects, one fundamental consideration is that music-making with DAWs is a unique creative process based in hybridity. As alluded to earlier, many DAW-based artists are hyphenated musicians. These

TABLE 1

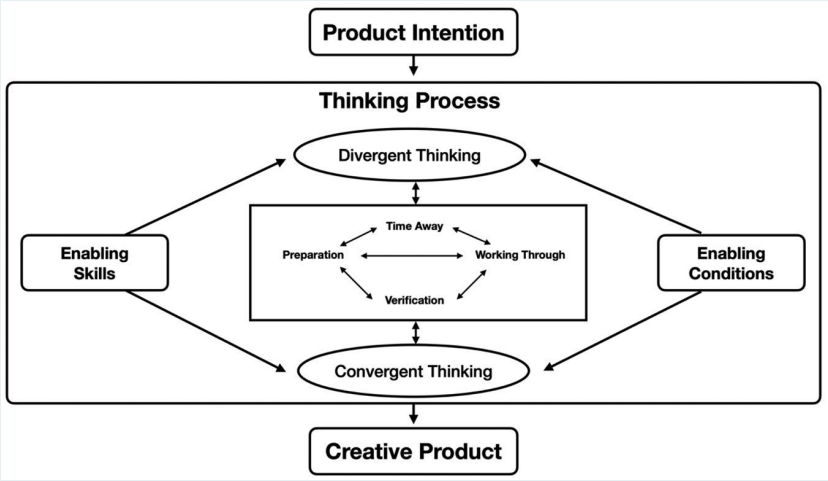
Curricular Resources

Resource	Description
Minds on Music: Composition for Creative and Critical Thinking (Michele Kaschub and Janice Smith, 2009)	**Music composition pedagogy:** Kaschub and Smith provide a clear and accessible resource on why to compose and how to structure composition at every age level.
Music Outside the Lines: Ideas for Composing in K–12 Music Classrooms (Maud Hickey, 2013)	**Music composition pedagogy:** Hickey's book is an accessible resource for understanding the creative process and how one might structure a composition-based music curriculum.
Using Technology with Elementary Music Approaches (Amy M. Burns, 2020)	**Elementary music technology:** Burns skillfully and seamlessly integrates a variety of elementary music approaches with technology.
Using Technology to Unlock Musical Creativity (Scott Watson, 2011)	**DAW projects:** Watson provides useful principles for organizing and supporting musical creativity with technology. He also details many practical projects to try in the music classroom.
The Music Technology Cookbook (Adam Patrick Bell, 2020)	**DAW projects:** Adam Patrick Bell has assembled over fifty music technology projects from many leading music educators. This book is full of practical projects, sorted by difficulty and technology.
Teaching Music through Composition with Technology (Barbara Freedman, 2013)	**General approach to composition with DAWs:** This book provides a comprehensive curriculum for teaching music through composition with DAWs. Freedman has developed a systematic approach for learning to compose with technology.
Electronic Music School: A Contemporary Approach to Teaching Musical Creativity (Will Kuhn and Ethan Hein, 2021)	**Electronic music production:** Hein and Kuhn provide a guide for starting electronic music classes at your school, practical project ideas, and how to grow your program into broader media creation program.
Interactive Composition (V. J. Manzo and Will Kuhn, 2015)	**Electronic music production:** Manzo and Kuhn provide a comprehensive method for composing a number of popular electronic music genres with Ableton Live.
Popular Music Pedagogies: A Practical Guide for Music Teachers (Matthew Clauhs, Bryan Powell, and Ann C. Clements, 2021)	**DAWs and songwriting:** Clauhs, Powell, and Clements provide pedagogies for popular music instruction, DAW-based composition, and songwriting.
Midnight Music (Katie Wardrobe) https://midnightmusic.com.au	**Website:** Midnight Music is a web-based professional development tool for teaching music with various technologies (DAWs, iPads, Chromebooks). Wardrobe has many practical resources, webinars, and blogs.
Technology in Music Education https://www.ti-me.org	**Website:** TI:ME is a music technology organization for music educators. They provide practical classes, resources, clinics, and other forms of professional development.
Jamzone (Little Kids Rock) http://jamzone.littlekidsrock.org	**Website:** Little Kids Rock is a not-for-profit organization that provides funding and pedagogical resources to K–12 schools and music teachers. The *Jamzone* is an extensive collection of tutorials and print resources for playing popular music and using technology in classrooms.
Hip-Hop Music Ed http://www.hiphopmusiced.com	**Website:** Hip-Hop Music Ed is a website of content and resources related to hip-hop music education curated by academics, a music teacher, and a music producer.
Music Educators Journal articles	"Songwriting with Iconic Notation in a Music Technology Classroom" (Clauhs, 2021); "Creating Virtual Ensembles: Common Approaches from Research to Practice" (Cayari, 2021); "Mixing It Up: Sound Recording and Production in School Music Programs" (Clauhs, Franco, Cremata, 2019); "Songwriting: A New Direction for Secondary Music Education" (Kratus, 2016); "Software-Based Scoring and Sound Design: An Introductory Guide for Music Technology Instruction" (Walzer, 2016)

Note: DAW = digital audio workstation.

FIGURE 1

Webster's Model of Creative Thinking in Music[1]



musicians shape the entire musical process in the course of their work, moving back and forth from composer, to performer, to producer, to sound engineer. Fundamentally, DAW-based projects should reflect this phenomenon. Each project should encourage skill building in multiple areas and allow students to occupy several musical roles. The range of potential creative products will be broad—film scores, classical/pop fusions, songs, hip-hop instrumentals, ensemble arrangements, and more. The unifying idea between the potential outcomes is a creative process that embraces a hybrid approach to music learning.

Follow the Creative Thinking Process

With a project in mind, Webster's creative thinking process will help you organize each project into stages (see Figure 1). The first stage in Webster's creative thinking process is *preparation*—where individuals explore their ideas, sharpen necessary skills, and plan the project. For example, imagine students are creating a pop song and need to write several catchy melodic hooks for the piece. The students might prepare by studying melody, composing melodies, and learning some basic recording and production techniques typical of popular electronic music. *Working through* is the second stage. In this stage, creators edit, revise, and organize disparate ideas into a workable whole. In the *verification* stage (the last stage), the final product is refined, polished, and prepared for final presentation. Each stage is interwoven with incubation periods, where the artist takes time away to process and rethink their creative work. A project-based approach grounded in Webster's model requires time and flexibility as individuals move between different stages.

Throughout the creative process, artists will exercise two types of thinking: convergent and divergent.[13] *Divergent thinking* involves imaginative thought and brainstorming—the exploration and realization of numerous musical ideas. In contrast, *convergent thinking* is more discriminatory. The artist accepts, rejects, or manipulates their musical ideas as they refine their creative path. For example, a composer might piece melodic fragments together into a coherent melody or apply a technical adjustment within the DAW to achieve a certain tone quality. Although divergent thinking tends to occur toward the beginning of the process and convergent toward the end, the creator oscillates between both at any given stage in the process. As students move back and forth through the creative process, help them recognize and apply different types of thinking depending on the product they are pursuing or their stage of creative thinking.

The final portion of Webster's model concerns enabling skills and conditions—the bank of knowledge and experiences used to enact a creative vision. *Enabling skills* are a critical part of the creative process. Hyphenated musicians must develop and combine several categories of enabling skills to be successful (see a deeper exploration of enabling skills in the next section). *Enabling conditions* are also essential to understanding what students wish to create and how they might create it. Enabling conditions include personal characteristics like interests, personality, and sociocultural features like cultural context, past experiences, and peer influence. As mentioned previously, music teachers should consider students' enabling conditions when designing instruction.

The Importance of Enabling Skills

DAW-based musicians occupy several musical roles and must exercise multiple types of musical skills.[14] Webster calls these abilities *enabling skills* because they facilitate the creative process. It is challenging to create a comprehensive list of enabling skills given the variety of creative outcomes DAWs afford. Nevertheless, pedagogues suggest students actively cultivate enabling skills in three categories central to creative music-making with DAWs: technological, musical, and compositional.[15] Although each project will inevitably bring all three skill categories together, teachers and students may—at times—focus instruction on some categories over others before integrating them during the creative process.

Technological Skills

Although an exhaustive list of DAW-based competencies is beyond the scope of this article, there are a few categories of essential proficiencies to keep in mind. First, learn essential DAW functions such as opening the DAW and saving/opening projects. Second, locate the prerecorded loop library and practice dragging, dropping, arranging, and editing (e.g., trim, cut, paste) loops on the DAW's workspace (the main window of the DAW). Third, record pitches and rhythms on different tracks using the DAW's virtual instruments. You may choose to use an external piano keyboard, the piano roll, the onscreen keyboard, or a touchpad to record. Fourth, record vocal and instrumental tracks using the computer's microphone. Fifth, adjust the volumes and add an effect on each track. Although this list represents a limited set of skills, it will provide a strong foundation for many types of DAW-based creative works.

Musical Skills

A broad interpretation of the musical elements provides a useful framework for categorizing the musical skills associated with DAW-based music-making (i.e., form, pitch, rhythm, timbre, texture, density).[16] I encourage music teachers to further refine or redefine the musical elements in terms of their students' music because the traditional elements of music do not always capture the unique features or priorities of some musical styles and genres. For example, electronic music producers might prioritize beat-making or sampling as their own elements, whereas film music composers might highlight harmony and melodic development. None of these elements are mutually exclusive, nor is there a hierarchy of elements. Still, some music teachers may wish to emphasize particular musical elements depending on their creative goals.

Form

Form is one of the most fundamental concepts for composing and arranging music. Fundamentally, the form organizes the musical work for the listener, with each section serving a different function. This organization occurs at a macro level (e.g., the structure of the whole musical work) and at a micro level (e.g., the design of a melody or beat). Music teachers may wish to promote common musical forms (e.g., rondo form, ternary form) or more specific forms characteristic of certain styles or genres. For example, over the last decade, popular artists increasingly use a series of melodic hooks (hook A, hook B, hook C) to structure a song (e.g., Post Malone's "Better Now").[17] This hook-based form contrasts with more familiar popular song forms like verse–chorus (e.g., "Ob-La-Di, Ob-La-Da" by The Beatles) or verse–prechorus–chorus (e.g., "Firework" by Katy Perry). In contrast, many classical or classical-contemporary composers use forms that emphasize the melodic development of one melody over several sections. Ultimately, each musical style will have norms and innovations in form. Therefore, regardless of the chosen form, student composers should think critically about how compositional principles interact with the form they are using to create an engaging listening experience (see unity/variety/tension/release below).

Pitch and rhythm

Melody and harmony are among the most common ways to organize pitch in popular music and Western classical music. It is necessary for music teachers to explicitly address how to compose melodies, bass lines, and harmonies consistent with particular genres or styles of music. Similarly, rhythm instruction will also be necessary for accompanying percussion, sequenced beats, or sampled beats.

Timbre, texture, density

Timbre, texture, and density are essential musical tools for expression and innovation in student arrangements and creative works.[18] DAWs offer many opportunities for timbral manipulation. Students may choose different virtual instruments, record their own, or alter the timbre of tracks with virtual effects (e.g., reverb, delay, distortion). Texture refers to the unique combinations of pitches, rhythms, and timbres. Students will benefit from listening to and analyzing music that includes compelling sound combinations to determine how they might attempt similar techniques. Last, density concerns the vertical number of sounds played simultaneously and the music's horizontal intensity (dynamics).

Compositional Principles

The technology, instrumentation, or musical elements I addressed previously are not artistic in and of themselves. These raw elements must be crafted and interpreted using compositional principles if performers or listeners are to draw meaning or feeling from them.[19] In keeping with this idea, DAW-based musicians also use compositional principles to inform how musical elements (e.g., melody, harmony) and technology are applied within their creative works. The compositional principles they employ may be universal or genre-specific and may be used explicitly or implicitly. Therefore, compositional principles may be viewed as an independent and essential category of hyphenated musicians. Although there are many compositional principles, here are three ideas useful for guiding DAW-based creative projects with students: unity versus variety, tension versus release, and balance.[20]

Unity Versus Variety

The compositional principle of *unity versus variety* refers to the idea that many musical works, regardless of genre or style, strike a balance between the expected and unexpected. If music is only predictable or familiar, listeners may become bored. On the other hand, if music is predominantly unpredictable and unfamiliar, listeners react with confusion and frustration. Compelling musical works tend to balance adherence to

a musical style's norms (unity, familiarity) while also including unexpected musical gestures (variety, unfamiliarity).

Students have an opportunity to apply the principles of unity versus variety as they use the musical element of form to organize musical loops and narrations in Project 1 (Arranging with Loops) and Project 2 (The Podcast; described in the following). As previously mentioned, form is a musical element and does not automatically generate meaning or feeling when applied to a musical composition. Instead, student composers will need to consider how the principle of unity versus variety interacts with arranging music into a form. For example, the Arranging with Loops project might include a surprising introduction capturing the listener's attention (variety), a groovy and predictable supporting rhythm in the body of the work (unity), sudden dynamic contrasts or texture changes that recapitulate earlier musical patterns in a new light (variety), and an expected and satisfying ending (unity; for further examples, see Table 2).

Tension Versus Release

Musical works also utilize *tension and release* to stir feeling in the listener. Composers may use various techniques such as rising and falling pitch, rhythmic complexity, sound and silence, consonance and dissonance, and dynamic changes to build tension and deliver satisfying relief at just the right moment. Examples of tension and release are nearly self-evident in many familiar musical works. For example, the song "We Found Love" by Rihanna and Calvin Harris includes a *build-up* and *pop drop* (terms drawn from electronic dance music) that utilize tension and release. The build-up consists of rising pitch, dissonance, swelling density, increasing rhythmic complexity, and a long duration to gradually increase anticipation before releasing to a satisfying and stable pop drop. Similarly, well-known works like Mozart's *Eine kleine Nachtmusik* (Movement 1) uses tension and release in the opening declarative arpeggiations and the bridge's driving rhythms (the passage linking the first theme and second theme). Each of the projects in this article apply the concept of tension and release.

Balance

Balance concerns the equilibrium between unity, variety, tension, release, and other compositional pairs.[21] The concept is perhaps more abstract than the previous two principles but is an integral part of the compositional process. For example, a student might begin revising her work and find it overly tense, unpredictable, and in a constant state of flux. She might balance this work by adding repetition and clarifying the form.

DAW-Based Music Projects: Three Introductory Examples

For those new to DAW-based music instruction, the following examples are meant to illustrate the sorts of projects you and your students might begin with and demonstrate pedagogical strategies for DAW-based music-making. Each of the projects are possible with web-based DAWs, accessible on any computer with a web browser and free or low cost (see Table 3). Project guides are included in the tables below.

Project 1: Arranging with Loops

In Project 1, you and your students will experiment with using a DAW to create a short song. The objective of this project is to arrange a song in a ternary form using only the DAW's prerecorded loops. Although this is an introductory project, the students must still occupy several musical roles—the engineer operating the software; the musician parsing time, beat, and rhythm; and the arranger deciding the best combination of loops based on compositional principles.

To accomplish this project, you will select prerecorded loops from the DAW's loop library and place them on the workspace (the main window of the DAW). Prerecorded loops are short musical excerpts that can be repeated over and over. Typically, these loops feature a single instrument playing a single part. For example, you might combine a drum loop, bass loop, and melodic loop to create the A section. Next, you could combine a new set of loops for the B section before repeating the A section at the end. See Table 2 for this project's lesson plan.

Project 2: The Podcast

In Project 2, you and your students will produce a short personal podcast (2 to 4 minutes). The students will record an original narration with the computer's microphone and arrange music to support the narration using prerecorded loops—thereby building on the skills from the previous project. Once again, students will fill many roles (e.g., arranger-narrator-writer-producer-sound engineer). To complete this project, the students will need to write and record a script, arrange transition music using prerecorded loops, edit audio clips, and use automation to mix the audio tracks appropriately. Although the podcast could address any number of topics, I recommend several prompts in Table 4, such as A Typical Day in My Life, Music and Me, and My Musical Heritage. See Table 4 for a detailed lesson plan.

Project 3: Beat and Melody Project

In Project 3, you and your students will compose and record a simple melody and a basic rock beat using a DAW. For the first two projects, the students arranged a song and created a podcast using prerecorded loops. As a next step, the objective of the Beat and Melody project is to record a basic rock beat (see Figure 2) and compose and record a short melody from scratch using the virtual instruments in the DAW. Virtual instruments are comparable to the voices available on an electronic keyboard

TABLE 2

Project 1 Guide: Arranging with Loops

Compositional Prompt/Inspiration: Arrange a song in A-B-A form using only prerecorded loops. Compose in any style or genre you wish, with eight to sixteen measures per section. For this project, choose from two inspirations. Compose to communicate a mood of your choosing (e.g., sad, euphoric, sleepy, happy) or select an audience to compose for (e.g., people at a dance, your parents, TikTok dance video).

Enabling Skills/Principles

Form - A-B-A form - Function of A vs. B	**Technology Skills** - Access the loop library to drag and drop loops - Loop, trim, cut, copy, paste loops - Mix with volume control
Rhythm - Beat and beat grouping (meter, measures) - Tempo	**Compositional Principles** - Unity versus variety - Tension versus release

PREPARATION I

DAW Exploration

Begin by clicking and dragging selected loops onto the DAW timeline, altering their length, and combining them with other loops. Notice how the loops are organized into measures based on the song's meter and how to adjust the tempo of the song. Allow students time to experiment and explore. After students have a feel for operating the DAW, introduce the compositional prompt through instruction and example.

Form, Unity, Variety

With the final project in mind, introduce the concept of form by exploring some familiar song forms and how composers unify the different sections while also using variety to create interest. Listen to a few musical examples and diagram their form with letter markings (e.g., A, B, C) or common names (e.g., verse, chorus, refrain, bridge, theme). Which sections return regularly? How do composers use instrumentation, texture, density, rhythm, and melody to create contrast between sections (variety) while still ensuring a cohesive sound across the entire song (unity)? How do composers unify each section within itself?

"Dynamite" by the K-Pop group BTS has several common pop form characteristics students will likely recognize. Rossini's *William Tell:* "Overture" and Orff's "Tanz" from *Carmina Burana* are classical examples with readily interpretable forms. Choose your own listening examples to explore as well.

Next, return to the compositional prompt. Encourage students to think of the A section as a theme, refrain, or chorus and the B section as an interlude, bridge, or breakdown. These conceptualizations will help them connect the listening examples to the project at hand. Furthermore, encourage them to draw on the listening examples as they consider how to unify the A and B sections through common instrumentation, style, or musical ideas. They might also consider how the repetition of the A section might vary in terms of instrumentation or expression, much like BTS restates each chorus in a slightly different way.

WORKING THROUGH I

Allow students ample time to start their project and apply the ideas discussed in the Preparation stage. After students have made some progress, return to the Preparation stage for a new concept: tension versus variety.

PREPARATION II

Sections of musical works are not only differentiated by same or different but also in terms of function. One of the many ways to explore function is through tension and release. For example, in the song "We Found Love," how does Rihanna use tension and release during the build-up to the instrumental "pop drop" after the first chorus. Rihanna uses techniques like driving rhythm, dissonance, a rising melody, and an extended duration to communicate a sense of tension before releasing. In Mozart's *Eine kleine Nachtmusik*, the fanfare and punctuated arpeggios in the introduction leave a sense of question or expectation (tension), released as the first theme begins. Remember, these compositional principles speak to why music causes human feeling. You and your students will likely find these qualities in any music people enjoy, so ask your students for their own musical examples. To apply this concept, students may wish to consider their B section as an opportunity to build tension toward a release in their A section.

(continued)

TABLE 2 (CONTINUED)

WORKING THROUGH II

As students arrange and refine their work, pause for formative feedback based on the enabling skills and principles. Regular feedback helps with several issues such as misinterpreting directions, time management, and feeling stuck in the creative process. Here are a few feedback strategies. First, highlight student work by playing projects, even incomplete projects, for the whole class. Discuss how the project aligns with project objectives, directions, and compositional principles. Second, encourage peer feedback. Students can use project directions, musical skills, compositional principles, and technical directions as guides.

VERIFICATION

Students should put the finishing touches on their compositions based on their feedback. Once the songs are complete, there are a number of ways to present them. First, the class might break into small groups to listen to each group member's work. Second, consider uploading each project to SoundCloud so friends and family members can easily hear. Third, ask to feature student musical work as intro and outro music on the morning announcements or TV show. Fourth, different school events may feature student work—warm-up music for basketball and volleyball games or school dances.

ASSESSMENT

Use the three categories of enabling skills/principles (i.e., musical, technological, compositional) to produce an assessment rubric for each project. For this project, the musical skills rubric might address the degree to which there is a clear ternary form. The rubric might also include point allocations for altering tempo or looping beats at natural cutoff points. For technology, points might be allotted for using specific DAW features such as the loop library, trimming/looping, and mixing tracks. Finally, the compositional principles portion of the rubric will require the most interpretation and is also one of the most important in offering creative feedback. Utilize unity versus variety and tension versus release as separate portions of the rubric. For each one, evaluate the degree to which students applied these compositional principles to the final version of their product. Is there a balance between unity and variety in the A and B sections? How does the student use tension and release to create musical interest from section to section or within sections?

Empower students with a clear rubric at the outset of the project to clarify project expectations. The skills/principles embedded in the rubric should be taught, modeled, and practiced throughout the creative process. For example, although compositional principles are useful, they may also seem vague on the first examination. Students will need multiple opportunities to listen to, create, and evaluate musical works with compositional principles in mind to develop an understanding of the principles and apply them to their work.

Note: DAW = digital audio workstation.

TABLE 3

Selecting a Digital Audio Workstation (DAW)

DAW Type	DAWs	Description
Web-based DAWs	Soundtrap www.soundtrap.com Soundation www.soundation.com BandLab www.bandlab.com Amplify Studio https://ampifymusic.com	If you are just beginning to explore DAWs in your classroom, I recommend web-based DAWs like Soundtrap, Soundation, or BandLab. These DAWs are accessible from virtually any computer with internet access because they run within a web browser (e.g., Chrome, Safari, Firefox) and operate on reasonably priced cloud-based subscriptions. Web-based DAWs might be especially appropriate for schools with limited computer access (e.g., one or two shared computer labs or laptop carts) or one-to-one Chromebooks because web-based DAWs do not require special software installation. The three projects detailed in this article are possible with web-based DAWs.

(continued)

TABLE 3 (CONTINUED)

Introductory software DAWs	GarageBand (Mac/iOS) Mixcraft (PC)	Both GarageBand and Mixcraft are more potent than the web-based DAWs. They have many of the features needed for reasonably complex composition projects. GarageBand for iOS has several unique features if you have access to iPads.
Advanced software DAWs	Logic Pro (Mac) Ableton Live (Mac/PC) Cubase (Mac/PC)	Advanced software DAWs are comprehensive music production tools used by many music professionals. Although each of these DAWs are highly versatile, Ableton Live is especially notable for electronic music production. Music teachers considering advanced instruction in both composition and music production should consider these software packages.

TABLE 4

Project 2 Guide: The Podcast Project

Compositional Prompt/Inspiration: Produce a short personal podcast (2 to 4 minutes) based on a prompt of your choosing. Prompt 1: Describe *A Typical Day in My Life.* What are the highs, lows, joys, and frustrations of your day? Prompt 2: Write a *Music and Me* podcast, sharing clips of the music you love and what music means to you. Prompt 3: Interview a family member about the music and musical activity of their childhood (*My Musical Heritage*). For the purposes of this lesson plan, I will describe the first project: *A Typical Day in My Life.*

Enabling Skills/Principles

Form

- Beginning, middle, end

Compositional Principles

- Unity versus variety
- Tension versus release
- Balance

Technology Skills

- Record audio
- Trim, copy, paste audio clips
- Arrange audio clips
- Volume automation

PREPARATION I

Ask the students to listen to an episode of a popular podcast and then analyze why they work so well. Here are few podcast examples that include narration and music. *Radio Lab* explores several compelling science questions. *Song Exploder* examines the journey of composing a song. Other podcasts like *Six-Minutes*, *Flyest Fables*, and *The Unexplainable Disappearance of Mars Patel* are excellent story podcasts for young people. How does the podcast grab and maintain the listener's attention? How do the music producers use musical elements to convey tension and release in accordance with the story? What are the unifying elements of the podcast, and how do they provide consistency? How does the podcast creator mix in variety, surprise, and novelty? This listening activity will help inform composition strategies later in the creative process.

The Podcast Project begins with script writing, so the students should explore the characteristics of an effective script during the first Preparation stage. One very simple framework for guiding student discussion and eventual script writing is beginning, middle, end. Beginnings capture our attention through mystery, humor, or the unexpected. The middle is for development—explaining details, exploring characters, introducing conflicts, and revealing disappointments. Storytellers use the end to resolve conflict, show character growth, or reveal a surprising twist. Ask the students to write and organize their script with beginning, middle, and end in mind.

WORKING THROUGH I

With these principles in mind, ask students to write an essay on a *Day in Their Life.* Encourage the class to write a script in three to five short sections. These sections will form the structure of their podcast. The scripts should be personal and engaging, so encourage your students to draw on humor, wit, sincerity, and honesty in their writing.

(continued)

TABLE 4 (CONTINUED)

PREPARATION II

With the script complete, demonstrate how to piece the podcast together. Record each essay section in separate clips using the built-in microphone or headphones with a microphone. Second, with each clip recorded, spread the audio clips apart on the timeline so there is room to edit them and add transition music between them. Third, use the prerecorded loops to fill each space with intro, transition, and outro music and music to quietly accompany the scripted portions.

WORKING THROUGH II

Students record and arrange their podcast. Encourage students to think about the observations they made of other podcasts during the Preparation I phase. Incorporate some of the feedback strategies detailed in Project 1.

VERIFICATION

The final step is producing the project. Most DAWs have a feature called *volume automation* in which you can lower and raise the volume on a particular track at a certain point in time. In general, reduce the accompanying music volume during the narrations and increase the volume after it is complete. After applying automation, listen to the whole project once more to ensure the levels are appropriate.

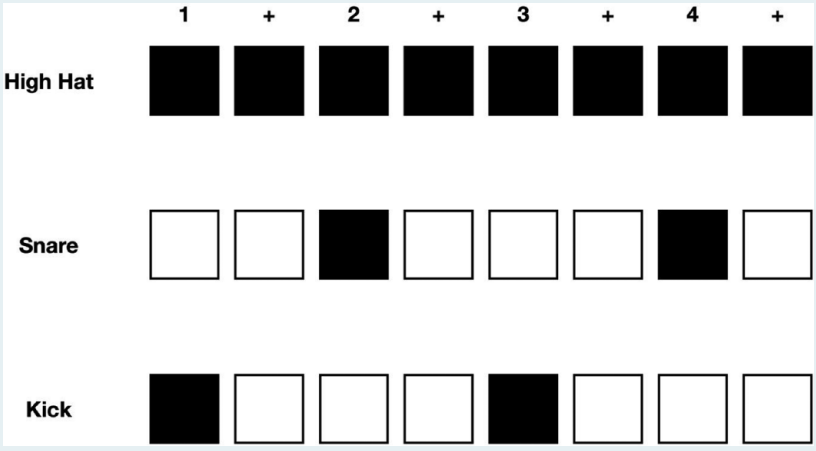
Present the projects by starting a class podcast feed or uploading them to SoundCloud or YouTube.

ASSESSMENT

Just as in Project 1, use the enabling skills/principles to create a rubric for this project. See Project 1 (Table 3) for additional explanation on designing rubrics based on enabling skills/principles. For technological skills, there are several new and important competencies to address in this project's rubric, such as recording and editing audio, arranging audio clips, and using volume automation to mix the project. Musical skills and compositional principles should address how musical loops and narration are arranged to create unity, variety, tension, and release. How are these compositional principles applied to create a sense of drama that engages the listener with the story and music throughout the podcast?

FIGURE 2

Rock Beat Grid



Source: Figure courtesy of the author.

(e.g., string sound, piano sound, guitar sound). Similarly, the students will select virtual instruments for recording their drum beat and melody (e.g., drum sounds, flutes, synthesizers, etc.). Like the first two projects, this project is consistent with a hyphenated musicianship model because the students must acquire the requisite musicianship associated with melodic composition, compose the melody for the project, and produce the final project using multiple virtual instrument tracks. See Table 5 for this project's lesson plan.

Resources for Future Projects

DAW-based music-making allows for a vast array of creative endeavors. Still, crafting projects or designing curriculum for the DAW-based music classroom may be challenging for music teachers inexperienced with DAW-based music instruction. Fortunately, the curricular resources for DAW-based music-making have steadily increased over the last several years, and most include numerous project ideas. If you are struggling to decide which resources to pursue or uncertain of the direction your class might take next, here are a few curricular/artistic categories that may elucidate which projects or resources might be most appropriate for your classroom. Admittedly, these categories overlap in

TABLE 5

Project 3 Guide: Beat and Melody Project

Compositional Prompt/Inspiration: For the first two projects, you arranged prerecorded loops on the DAW timeline. As a next step, compose your own melody and beat (two to four measures in length). A great deal of popular music includes a catchy melodic hook and an attractive rhythm. Draw inspiration from music you know and enjoy.

Enabling Skills/Principles

Melody - Melodic guidelines (Preparation II) - Major scale/minor scale - Piano keyboard, piano roll	**Rhythm** - Beat and subdivisions - Rock beat (see Figure 1)
Technology Skills - Create new virtual instrument tracks - Record virtual instruments - External piano keyboard - Piano roll, beat sequencer grid	**Compositional Principles (Melody)** - Unity versus variety (repeated patterns, form) - Tension versus release (rising, falling, resolution)

Split the Beat and Melody project into two phases: the beat phase and the melody phase.

PREPARATION: Beat Phase

For the beat phase, record a simple rock beat. The most direct way to demonstrate the rock beat is using a beat grid (see Figure 1). Encourage your students to clap, tap, or speak the kick, snare, and high-hat rhythmic patterns.

WORKING THROUGH: Beat Phase

With an understanding of the basic rock beat established, your students should start a new project and recreate the rock beat using the DAW's beat grid. Start a new drum track, access the beat grid, and input the rhythms as in Figure 1. Loop the beat so it extends for four measures. With the rock beat established and recorded, you might decide to move on to the project's melodic portion, or you may wish to explore beat further (see the Extension section of this project guide).

PREPARATION I: Melody Phase

The students will record a familiar tune in preparation for composing and recording an original melody (e.g., Mary Had a Little Lamb, Twinkle-Twinkle Little Star, etc.). There are several ways to record a melody. First, start a new virtual instrument track and record the melody using an onscreen keyboard or an external keyboard connected to the computer. Be sure the students set the tempo at a reasonable pace, turn on the click track, and do their best to follow the click's steady pulse as they play the melody. Second, some users prefer to use the piano roll tool to draw the melody. For this option, access the piano roll for the virtual instrument track and use your pointer to add pitches and modify their durations.

PREPARATION II: Melody Phase

Once students understand how to use the DAW to record a melody, the students will compose their own melody on a new track. One effective way to learn melody writing is to derive melody writing guidelines from melodic examples. Here are some suggested guidelines and melody examples.[25]

First, catchy melodies often have a predictable form, just as songs do. This is in keeping with the compositional principles of unity versus variety, where repetition of melodic and rhythmic patterns provide unity. Second, many melodies tend to begin and end on a home tone (related to tension and release). Third, tuneful melodies are written to be singable, meaning they don't skip around wildly but tend to proceed with small steps and skips. The chorus of "Break My Heart" by Dua Lupia and "Stay with Me" by Sam Smith are two pop melodies that illustrate these ideas well. Fourth, some melodies ascend in pitch to increase tension and descend to provide release. The chorus of Olivia Rodrigo's "Driver's License" is an excellent example of rising tension in a melody. Mozart's Piano Sonata no. 16 and J.S. Bach's BWV 645, "Wachet auf, ruft uns die Stimme" are strong classical examples.

(continued)

TABLE 5 (CONTINUED)

In short, a few suggested guidelines might be: (1) Limit the range of the melody (a fifth or octave), (2) limit the length (two to four measures), (3) begin and end on a home tone, (4) use repeated notes or groups of notes, (5) mostly step and sometimes skip, and (6) compose a melody that rises and falls, either in sections or across the entire melody.

WORKING THROUGH II: Melody Phase

Next, students should compose their two- to four-measure melodies according to the guidelines. They may choose to record them using the piano keyboard on the DAW or the piano roll. If either of these methods proves cumbersome or confusing, encourage students to access the Chrome Music Lab (https://musiclab.chromeexperiments.com) and use the song maker to draw the notes of their melody. This is a very intuitive interface—essentially, a simpler piano roll.

VERIFICATION: Melody and Beat Combined

The final step is to layer the melody and the beat together on separate tracks.

EXTENSION

If students wish to explore beat further, consider having them write a four-measure beat with variations in the second and fourth measures. They might also attempt to change the drum sounds or add effects. To explore different types of beats, there are several online tools useful for exploring the beat construction—one of them is Ableton Live's Learning Music Interactive Website: https://learningmusic.ableton.com. For melody, consider exploring timbre and density by changing the sound of the melody and copying and pasting it on several tracks or in several octaves.

ASSESSMENT

See Project 1 (Table 3) for additional explanation on designing rubrics based on enabling skills/principles. For Project 3, there are several technical and specific competencies to address in each category. For technological skills, the rubric might address the use of virtual instruments, recording, and effects. For the musical elements of melody and rhythm, use the rubric to guide student knowledge and practice. For example, the rubric might include some simple melodic guidelines such as: (1) the melody is four measures long, (2) the melody begins and ends on a home tone, (3) the melody moves mostly be step and sometimes skips, and (4) the melody use repeated rhythmic figures. Guidelines like these clarify how to write effective melodies and provide clear lines of assessment for the final product.[25] Finally, in this case, the compositional principles are intimately connected to the musical elements. For example, the rising and falling of a melody is connected to the principle of tension and release. Therefore, the rubric might be framed in terms of musical elements or compositional principles. The music teacher could choose how to frame the rubric based on their instruction and preferences.

Note: DAW = digital audio workstation.

many ways, and some pedagogues may fairly criticize this list as subjective or arbitrary. Nonetheless, trying to understand the landscape of DAW-based creativity for the first time is challenging, and a few curricular categories may provide some needed clarity when deciding which resources are best suited for you and your students. See Notes and Table 1 for more specific references.

First, several DAW-based resources describe *stand-alone* projects.[22] These projects tend to require little prior knowledge and may be easily integrated ad hoc into a general music or ensemble class. Second, perhaps the fastest growing category of DAW-based curriculum is *electronic music production* (EMP).[23] In general, EMP curriculums address pop, hip-hop, and dance genres. DAWs lend themselves well to EMP, and you may find your students naturally gravitate toward these popular musical styles—for example, most Top 40 music involves EMP techniques. Third, several pedagogues have recently addressed *songwriting* with DAWs.[24] Fourth, some curriculum designers take what might be called a *general approach*, where the musical elements structure the curriculum (e.g., rhythm, melody, harmony). This approach enables students to compose in their preferred musical styles while allowing the teacher to guide the whole class through a unified curricular framework.[25] Music teachers may find this approach intuitive because the musical elements represent a familiar model for organizing general music instruction. Lastly, a *multimedia approach* centers on music plus other media. Examples might include podcast production, film scoring, or video game music. Music teachers may find a general approach is effective for multimedia projects. The curricular categories mentioned here are not exhaustive and share many similar features. If you are new to DAW-based music-making, I recommend starting with the projects in this article. As you work through the projects, consult the curricular resources in Table 1 for additional projects and long-term curricular plans.

First Steps to Music-Making

The multiple musical skills and creative processes inherent in DAW-based music instruction may provide a unique opportunity for students to develop an expansive and hyphenated musicianship. The pedagogical frameworks and DAW-based creative projects in this article are designed to help teachers establish fundamental skills and understandings for successful DAW-based music-making in their classroom. For music teachers who are new to DAW-based music instruction, consider the pedagogical frameworks, project plans, and curricular resources in this article as a first step toward creative music-making with DAWs.

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