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# Musicals in the STEAM Curriculum: Framing Instruction with Show Tunes and Themes

## **Abstract**

Musicals, a part of the arts, have potential in the STEAM curriculum. A long history of stage, film and television musicals are present within popular culture. Musicals can foster STEAM especially in terms of the technical aspects of theatre, cinema and television production. STEAM educators can utilize show tunes and themes to frame lessons as outlined in a number of examples. A description of a high school curriculum integration program provides examples of how school musicals can foster STEAM areas. These musicals illustrate how STEAM instructors can capitalize on musicals with their students.

## **Author/Artist Bio**

Keith Mason, Ph.D. is an educational consultant based in New Providence, New Jersey. He specializes in curriculum, language education, phonetics, Romance linguistics and musicals across the curriculum. He has published extensively about musicals in the interdisciplinary curriculum and is currently writing a book *Musicals across the Curriculum: Interdisciplinary Pathways to Learning*. Dr. Mason is the recipient of eight Paper Mill Playhouse Rising Star Awards for Educational Impact for integrating musicals into the high school curriculum and supporting state curriculum standards.

## **Keywords**

STEAM, curriculum, musical theatre, musical film, lesson design

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## **Musicals in the STEAM Curriculum: Framing Instruction with Show Tunes and Themes**

*Keith Mason*

### **Introduction**

The A of STEAM is a welcome addition to the original STEM concept. Musicals, a prime component of the arts and popular culture, can be integrated into an interdisciplinary STEAM curriculum. This article addresses musicals as a part of the arts and their contribution to the STEAM curriculum. It then outlines a brief history of musicals on both stage and screen. The next section goes into all five components of the STEAM umbrella and is followed by curricular frames outlining specific musicals and show tunes and how they may help delineate STEAM instruction.

### **Musicals and the Arts**

Musicals in themselves are worthy of study as an important part of the performing arts and popular culture. Students trained in STEAM can be equipped to work in theatre, film or television production that involve musicals because they will understand the nature of musicals, their structure and the scientific and artistic elements involved in producing them. Sousa & Pilecki (2018) outline specific forms of art that can be treated in the STEAM curriculum including music, visual arts and drama. Musicals foster arts standards such as visual arts, music, theatre and dance.

Musicals exemplify both creativity and divergent thinking. Consider the hundreds of musicals created over the past century and a half; students can learn about the creative process

and divergent thinking by analyzing musicals, their creation and their musical scores. Musicals also promote interdisciplinary learning not only in STEAM but in other subjects as well because of the variety of themes and settings present. Musicals enable personalized learning and promote project-based learning (see Mason 2018b).

### **Musicals: A Brief History**

While plays with music can be traced back centuries, the unique American form is generally traced back to the middle 1800s (Stempel, 2010). They truly blossomed in the twentieth century and are still going strong at theatres globally. Colleges and high schools in particular stage musicals. Live stage musicals were the sole form until the film process was developed. Now, stage, film and TV musicals are found. This area of endeavor employs talented and creative artists who bring these musicals to the stage, silver screen and TV screen. Because of the variety of musicals, they are rich educational resources. A number of composers and lyricists have created the music of musicals including Irving Berlin, Cole Porter and Rodgers and Hammerstein.

Musicals represent a gargantuan body of creativity. They are brought to life by numerous artists and scientists including actors, singers, composers, lyricists, librettists, orchestrators, choreographers, scenic designers, costumers, makeup artists, hair stylists and technicians. While musicals have been enjoyed as part of the entertainment world, they have a huge potential for educational purposes, including STEAM. Musicals have an advantage over other music genres because they generally have a strong storyline and their songs are performed within the context of the storyline. Thus, most musicals are inherently thematic and can be treated within a concept-

based curriculum framework. Green (1996) provides a chronological overview of Broadway musicals and Green (1999) offers a chronological overview of film musicals.

Recently, some television networks regularly broadcast live musicals making them readily accessible. NBC produced *Jesus Christ Superstar Live in Concert* and FOX Television offered *Grease Live*. Fox Television recently offered a live version of *Rent*. Many television and cable channels broadcast film musicals or recorded stage musicals.



Keith Mason posing for a publicity photo for a school production of *Hello, Dolly!*

## The STEAM Curriculum

By the year 2022, there will be one million job openings in STEM fields according to the Bureau of Labor Statistics. Sousa & Pilecki (2018) argue that STEM by itself has not shown a significant influence on student achievement and argue that the addition of the A or arts to STEM is what can potentially be a game changer for student achievement and creativity. Harper (2017) also promotes STEAM and Rajan (2016) promotes musical theatre for academic learning.

All five areas of the STEAM umbrella can be linked to musicals in the curriculum.

**Science:** Some musicals invite scientific lessons. For example, *The Sound of Music* invites students to explore Alpine-related themes (edelweiss flowers, the formation of the Alps, the geological study of the Alps). *The Wizard of Oz* invites the analysis of gems (emeralds, rubies) and poppies. *Chitty Chitty Bang Bang* could introduce students to inventors, car making, car racing, and candy making.

**Technology:** The technical aspects of staging musical plays or producing films for cinema or television can be explored. Sound engineering and mixing, photography, editing, digital special effects and TV production are all possibilities.

**Engineering:** Creating specific props such as the car for *Chitty Chitty Bang Bang*, hydraulic sets for musicals or Computer Assisted Design (CAD) of blueprints for scenic design or furniture could be explored.

**Arts:** Sets, costumes, make up, hair styles and production design all involve art and design. Concepts of musicals are inherently artistic. Publicity posters, show graphics and show programs also encourage artistic creativity.

**Mathematics:** Set construction, timing for syncing music, measuring for sewing costumes and spatial understanding for painting, sculpture and set design all involve math.

At the high school level, I integrated our spring musicals into the curriculum. Musicals invite integration in specific subjects including the STEAM areas. I was involved with this type of integration eight times including initiatives and projects that promoted STEAM subjects.

Fabric arts projects promoted mathematical/logical, linguistic, spatial and intrapersonal intelligences as outlined in Gardner's Multiple Intelligences framework. Other projects that combined art and language included show programs, paper dolls of cast members with biographies, drawing, mural painting and food preparation tied to the time period of specific musicals. Lobby and cafeteria displays featured artwork and curricular projects.

The musicals initiative went beyond our school in a few positive ways. Teachers at other schools could benefit from our work by reading about it in magazine publications in educational magazines about the interdisciplinary musical and the Great American Songbook (Mason, 2002a, Mason, 2002b, Mason, 2015). I wrote subject-specific articles bridging musicals to foreign languages (Mason, 2011), fabric arts (Mason, 2017d), language arts (Mason, 2002c), and social studies (Mason, 2017a). This article bridges musicals to STEAM encouraging the exploration of ways to utilize musicals for the technical aspects of producing stage and film musicals, as content rich resources for intradisciplinary and interdisciplinary learning and to expose students to multifaceted art forms known as musical theatre and musical film.

I published milestone tributes to musicals that were first staged thirty or more years earlier. These included *Into the Woods*, *My Fair Lady*, *Oklahoma!*, *The Sound of Music* and *West Side Story*. *Hamilton* is a recent article because of its phenomenal status and its potential for student learning, especially in history and music (Mason, 2017b). The most gargantuan result of a program that began small is a book-length description of musicals across the curriculum that I am currently authoring.

## **Curriculum and Curricular Frames**

Curriculum approaches such as concept-based curriculum (Erickson, 2008), Understanding by Design, standards-based curriculum, 21<sup>st</sup> century standards, subject-driven approaches and interdisciplinary learning can all be a part of STEAM programs.

Curricular frames outlined later include examples of specific musicals and how they can support the five components of the STEAM acronym. By frames, I refer to the use of concepts, themes or songs from musicals to help delineate what students will learn. Many musical-related STEAM lessons can be fostered using the Multiple Intelligences and Habits of Mind at various grade levels. For example, a combination of intelligences can be used in lesson plans highlighting musicals (see Armstrong, 2018; Mason, 2017d) and musicals can foster the Habits of Mind (as in Mason, 2017b). Sousa & Pilecki (2018) recommend the Multiple Intelligences and Bloom's Taxonomy (Bloom et al 1956) to develop STEAM lessons.

Consider using study guides, film clips, audio tracks of show tunes, and print and digital materials about musicals. Play show tunes with lyrics for focused listening and instrumental show tunes as background music while students work. Goble & Goble (2016) offer LEOs or Learning Experience Organizers as open-ended activity prompts. These invite students to take on roles of various professionals who must react to texts (including non-traditional media) in different ways. These invite sharing different perspectives with classmates. Some of the professions include cartoonist, performer, set designer, sound mixer and tech specialist.



## **Musicals and Their Themes Invite Curricular Integration**

Entire musicals can benefit students through their storylines, concepts, themes, characters, settings, time periods and songs. Consider the following examples:

*The Sound of Music*: music, Austria, Nazi takeover

*My Fair Lady*: Edwardian London, social classes, language and speech analysis, flowers

*West Side Story*: gangs, Puerto Rican immigration, Romeo and Juliet, New York City

The following ideas can be used tied to an entire musical:

- Create storyboards for a scene from a musical using technology
- Design a set for a musical using Computer Assisted Design (CAD) or a handmade model
- Choose a show tune and apply it to one of the STEAM disciplines through analysis
- Create paper dolls of famous scientists, engineers, tech experts, mathematicians
- Compose a character song in the style of a show tune to describe a paper doll figure
- Create lighting for a musical scene using colored lights through the art and science of light.
- Create a mural, fabric or digital quilt or other hands on options (see Mason, 2017d; Mason, 2018b).

Outline a timeline for math practice tracing important events in *Hamilton* or another musical where the passage of time is important (e.g., *1776*, *Oklahoma!*, *Carousel*).



Interdisciplinary quilt tied to a school production of *Bye Bye Birdie*

### Show Tunes: General and Specific

Songs are an important component of musicals. Students could listen to show tunes or watch musical scenes to build listening and vocabulary skills. To make this more active, students could perform show tunes using electronic instruments or a combination of electronic and traditional instruments and also sing the lyrics.

Rousu (2018) explains how he uses songs from musicals to teach key concepts in economics. He also maintains a web site: [broadwayeconomics.com](http://broadwayeconomics.com) For example, Rousu uses “Cabinet Battle #1” from *Hamilton* to address how Thomas Jefferson and Alexander Hamilton argue whether there should be a national bank and whether the U.S. government should assume debts of the states. Rousu’s idea of using show tunes are in step with what I am proposing here for framing STEAM lessons and units.



Display board featuring sailors for a production of *Anything Goes*

A number of show tunes have titles or lyrics that can help frame STEAM lessons. Consider the following songs with the show from which they derive in parenthesis:

“The Candy Man” (*Willy Wonka and the Chocolate Factory*)

Candy making especially the chemistry involved.

"The Carousel Waltz" (*Carousel*)

Engineering and construction of carousels, calliope music, history of the carousel amusement and “The Carousel Waltz.”

"Chitty Chitty Bang Bang" (*Chitty Chitty Bang Bang*)

Create a timeline of car manufacturing, learn about car engines and other aspects of cars in technology, engineering terms, what math is involved in creating automobiles, car racing and cars in international perspective.

"Climb Ev'ry Mountain" (*The Sound of Music*)

Mountain ranges invite STEAM-related lessons including flora and fauna, geology, gemology and culture related to specific mountain regions (Alpine, Andean or Appalachian).

"Defying Gravity" (*Wicked*)

Students learn about gravitational pull on Earth versus on the Earth’s moon.

"Doll on a Music Box" (*Chitty Chitty Bang Bang*)

Explore the creation of music boxes as problem-based learning using concepts from STEM.

Learn the song "Doll on a Music Box" as a singalong.

“Good Morning Starshine" (*Hair*)

Star unit and study of light, light years and astronomy in earth science or astronomy course

"I Feel the Earth" (*Beautiful - The Carole King Story*)

Students learn about earthquakes and tremors.

"It's a Small World" (Disney theme park attraction song)

Technology makes global communication easier than ever compared to earlier generations.

"June Is Bustin' Out All Over" (*Carousel*)

This song encourages discussions of nature and its common occurrences, especially during spring.

"My Favorite Things" (*The Sound of Music*)

Students create their own lyrics to this song using concepts from STEM. They then describe each reference in a written form (montage, poster, projectable slide) in terms of history, person who developed the idea, applications of the idea in the modern world.

"On a Clear Day You Can See Forever" (*On a Clear Day You Can See Forever*)

Clean atmosphere versus pollution in environmental science course.

"Over the Rainbow" (*The Wizard of Oz*)

A series of lessons about rainbows, prisms and the color spectrum

"Put on Your Sunday Clothes" (*Hello, Dolly!*)

The clothing industry and how clothes are made today compared to in previous times.

"Putting It Together" (*Sunday in the Park with George*)

Engineering feats and physics of building structure

"The Roses of Success" (*Chitty Chitty Bang Bang*)

What do the lyrics of this song say about the lives of inventors?

"The Sound of Music" (*The Sound of Music*)

Explore acoustics of speech sounds, musical instrument sounds and choral music, the anatomy of vocal cords and the pharynx and how they determine voice ranges, pitch, vibrato, and voice quality. Explore phonetics, the science of speech.

"Steam Heat" (*The Pajama Game*)

Analysis of steam vapor, liquids, solids and the role of temperature for forms of matter in a physics class.

"Sun and Moon" (*Miss Saigon*)

Lessons about the sun, moon and other heavenly bodies in earth science or astronomy course.

"Talk to the Animals" (*Doctor Dolittle*)

Animal communication in biology or zoology.

### **Summary**

Because musicals are a key component of the arts, they are ideal for concept-based curriculum within the STEAM umbrella. The examples here can be adapted to the dozens of available musicals and can be particularly effective when linked to the staging of a school musical. The ideas here also allow framing instruction with show tunes and themes.

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