

# Application of STEM Standards with Music Concepts I

Target audience: Elementary school children (aged 6-10)

Duration: 45 minutes

**Objective: To introduce and demonstrate the connection between STEM (Science, Technology, Engineering, and Mathematics) standards and music concepts through the use of guitar, accordion, and drums.**

Materials:

Guitar

Accordion

Drum

Contrabass balalaika

Audio/Visual equipment for presentation

**Outline:**

## **I. Introduction (5 minutes)**

**A. Welcome students**

**B. Briefly explain the connection between STEM and music**

**C. Introduce the three instruments that will be used in the program: guitar, accordion, and drum**

## **II. Science and Music (10 minutes)**

**A. Sound and vibrations**

**1. Explain how musical instruments produce sound through vibrations**

**2. Demonstrate how the guitar, accordion, and drum produce vibrations**

**B. Pitch and frequency**

**1. Introduce the concepts of pitch and frequency**

**2. Show the correlation between pitch and frequency using the instruments**

**3. Allow students to experiment with the instruments to explore pitch and frequency**

## **III. Technology and Music (5 minutes)**

**A. Electronic instruments and amplification**

**1. Briefly discuss electronic versions of the instruments (e.g., electric guitar, electronic drums, digital accordion)**

**2. Show how these instruments can be connected to amplifiers and speakers to control volume**

**3. Introduce students to looper and show how technology help make music**

## **IV. Engineering and Music (10 minutes)**

**A. Instrument design and construction**

**1. Describe the basic parts and construction of the guitar, accordion, and drum**

**2. Discuss the materials used in making these instruments and why they are chosen**

**B. Acoustics and sound engineering**

**1. Explain how the shape and design of the instruments affect the sound they produce**

**2. Discuss the role of acoustics and sound engineering in designing performance spaces and recording studios**

## **V. Mathematics and Music (10 minutes)**

**A. Rhythm and counting**

**1. Introduce the concept of rhythm and beats**

**2. Show students how to count and clap basic rhythms using simple time signatures**

**B. Patterns and symmetry**

**1. Explain how musical compositions often involve patterns and symmetry**

**2. Provide examples of patterns in music and have students identify them using the instruments**

## **VI. Conclusion (5 minutes)**

**A. Recap the connections between STEM and music**

**B. Encourage students to explore STEM and music further**

**C. Thank the students for their participation and answer any questions**

With this plan, students will gain an understanding of how STEM principles can be applied to music and gain hands-on experience with the guitar, accordion, and drum. By using these instruments to illustrate the connections between STEM and music, students will be encouraged to explore both fields further.

# Application of STEM Standards with Music Concepts II

Target audience: Middle school children (aged 11-14)

Duration: 45 minutes

**Objective: To introduce and demonstrate the connection between STEM (Science, Technology, Engineering, and Mathematics) standards and music concepts through the use of guitar, accordion, drum, and contrabass balalaika, while incorporating famous Ukrainian, Spanish, American, and Balkan melodies.**

Materials:

Guitar  
Accordion  
Drum  
Contrabass balalaika  
Audio/Visual equipment for presentation  
Selected famous Ukrainian, Spanish, American, and Balkan melodies

Outline:

I. Introduction (5 minutes)

- A. Welcome students
- B. Briefly explain the connection between STEM and music
- C. Introduce the four instruments that will be used in the program: guitar, accordion, drum, and contrabass balalaika
- D. Mention that famous melodies from Ukraine, Spain, America, and the Balkans will be incorporated throughout the session

II. Science and Music (10 minutes)

- A. Sound and vibrations
  1. Explain how musical instruments produce sound through vibrations
  2. Demonstrate how the guitar, accordion, drum, and contrabass balalaika produce vibrations
  3. Play short excerpts from famous Ukrainian and Spanish melodies to showcase different vibrations and sounds
- B. Pitch, frequency, and harmonics
  1. Introduce the concepts of pitch, frequency, and harmonics
  2. Show the correlation between pitch, frequency, and harmonics using the instruments
  3. Play examples from famous American and Balkan melodies to illustrate these concepts

III. Technology and Music (10 minutes)

A. Electronic instruments and amplification

1. Discuss electronic versions of the instruments (e.g., electric guitar, electronic drums, digital accordion, electric contrabass balalaika)
2. Show how these instruments can be connected to amplifiers and speakers to control volume
3. Introduce students to looper, MIDI and digital notation
  - a. Explain the concepts of looper, MIDI and digital notation
  - b. Demonstrate how looper and MIDI controllers can be used to create music using various instrument sounds
4. Show examples of famous Ukrainian, Spanish, American, and Balkan melodies, and how it can be sound with and without looper and MIDI

IV. Engineering and Music (10 minutes)

A. Instrument design and construction

1. Describe the basic parts and construction of the guitar, accordion, drum, and contrabass balalaika
2. Discuss the materials used in making these instruments and why they are chosen
- B. Acoustics and sound engineering
  1. Explain how the shape and design of the instruments affect the sound they produce
  2. Discuss the role of acoustics and sound engineering in designing performance spaces and recording studios
  3. Introduce students to the concept of sound isolation and room treatment
  4. Play short musical parts from famous Ukrainian, Spanish, American, and Balkan melodies to demonstrate the importance of acoustics

V. Mathematics and Music (5 minutes)

A. Rhythm, time signatures, and counting

1. Introduce the concept of rhythm, time signatures, and beats
2. Show students how to count and clap complex rhythms using various time signatures
3. Use excerpts from famous Ukrainian, Spanish, American, and Balkan melodies to illustrate different rhythmic patterns and time signatures

B. Patterns, symmetry, and scales

1. Explain how musical compositions often involve patterns and symmetry
2. Provide examples of patterns in famous Ukrainian, Spanish, American, and Balkan melodies and have students identify them using the instruments
3. Discuss scales and their mathematical relationships in music
4. Play parts of famous melodies from each of the regions to demonstrate the use of various scales and mathematical patterns

VI. Conclusion (5 minutes)

A. Recap the connections between STEM and music, and the importance of famous Ukrainian, Spanish, American, and Balkan melodies in illustrating these concepts

B. Encourage students to explore STEM and music further, as well as appreciate the rich cultural history behind the featured melodies

C. Thank the students for their participation and answer any questions

With this plan, middle school students will gain an understanding of how STEM principles can be applied to music, while also being introduced to the rich musical heritage of Ukraine, Spain, America, and the Balkans. The inclusion of famous melodies will help students connect the STEM concepts to real-life examples, making the learning experience more engaging and memorable.