

## ***Mathematics: The Language of STEM***

### Lesson #2: Musical Form and Ratio

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#### **CONTENT AND TASK DECISIONS**

**Grade Level(s): 6**

**Description of the Task:** Use the concept of ratio to create a form for a musical composition

**Indiana Mathematics Content Standards:** 6.NS.8 Interpret, model, and use ratios to show the relative sizes of two quantities. Describe how a ratio shows the relationship between two quantities. Use the following notations:  $a/b$ ,  $a$  to  $b$ ,  $a:b$ .

**Indiana Mathematics Process Standards:** PS.6 Attend to precision

**Mathematics Content Goals:** Students will use ratio to create a form for their music composition

**Language Objectives:** Children will be able to use the terms Introduction (beginning), Verse (story e.g. “Dashing through the snow, in a one-horse open sleigh”), Refrain (“hook” e.g. “Jingle Bells, jingle bells, jingle all the way”), Bridge (break), and Coda (end) correctly

**Materials:** iPod. Garage Band App, Live Loops, Headphones

#### **THE LESSON**

**Before:** This phase of the lesson should be designed to get students ready for problem solving. It also provides an opportunity for you to find out what they already know about the topic. Describe how you will accomplish each of the following in this phase of the lesson:

- **Activate prior knowledge** Play a familiar song to the students and have them listen to the way the song is organized
  - What is one of your favorite songs?
  - Why do you like it?
  - What makes a song good?
  - How do you think the song is organized?
  - Do you notice any patterns in the organization of the music?
  - Can the organization of musical ideas effect the quality of the song?
- **Be sure the problem is understood**
  - How can the concept of ratio be used to create a good song?
  - Use a listening map to aid in the understanding of form and ratio
- **Establish clear expectations**
  - Students will create and record short, musical ideas into their iPads using GarageBand. Students will combine their ideas in particular ratios to a write complete song. Student songs will be uploaded to a classroom YouTube page for performance and assessment.

**During:**

- **Let go,** Students will explore and create various 2,4, or 8-bar musical ideas on their iPads. Students will choose four of their best ideas to create a complete song.

- **Listen actively**, the teacher will circulate throughout the room, listening to various student ideas and offering guidance and support when appropriate
- **Provide appropriate support** Provide appropriate positive feedback and support
- **Provide worthwhile extensions**. Allow the children to work on other musical phrases at home or at their own leisure. Visit and Skype with a professional song writer who can teach the children about songwriting and musical form

**After:**

- **Promote a mathematical community of learners** Have the class divide into pairs or trios. Have the children share their musical ideas with one another. Allow each child to critique and provide suggestions for each musical idea of their partner or partners. Work together, as a class, to create a common form for each student to input their musical ideas. Have groups work together to make sure that the proper form of ratio of ideas is met.

Have a “science fair”-type program where the children present their songs to their parents, families, and others.

- **Listen actively without evaluation**
  - How can you improve your song?
  - What other elements could be added to your idea?
  - What should you listen for when combining ideas into a complete song?
- **Make connections**
  - How can you organize your ideas together to create a complete song?
  - How does the form of a song effect the final product?
  - What would happen if you changed the ratio of each section?
  - Can we add new sections? What would be the effect?
  - How many beats are there in a rotation of the sound block?
- **Summarize main ideas**
  - What ratio of the song comprises the introduction?
  - What ratio of the song comprises the verse?
  - What ratio of the song comprises the chorus?
  - What ratio of the song comprises the bridge?
  - What ratio of the song comprises the coda?

## ASSESSMENT

**Observe:** Students will upload their finished compositions onto a classroom YouTube page. I will gather evidence by listening to their compositions and determining whether or not the song “flows”. If a student follows the suggested form/ratio format, then their song should have a natural flow to it. Students will rate the quality of their compositions by the number of views and comments on their song. Students will be able to tinker with and re-upload their songs at any time.

**Ask:** List the specific questions you will ask students to assess their learning.

- What do you like about your song?
- What do you dislike about your song?
- Does your song follow an appropriate form?
- How can you improve your song?