Amping Up Violin Tuning with Math

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Primary Type: Perspectives Video: Professional/Enthusiast

Kyle Dunn, a Tallahassee-based luthier and owner of Stringfest, discusses how math is related to music.

Subject(s): Music, Mathematics
Grade Level(s): 6, 7, 8, 9, 10, 11, 12
Intended Audience: Educators

Keywords: Violin, tuning, music, sound, Kyle Dunn, Stringfest, Tallahassee, harmonics, octave, luthier, ratio, scale, hertz, distance, overtones, half, third, quarter, math and music, violin, mandolin
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Related Standards

Name	Description
MAFS.6.RP.1.2:	Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."*
MAFS.6.RP.1.3:	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. a. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?* c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. e. Understand the concept of Pi as the ratio of the circumference of a circle to its diameter. ([1]See Table 2 Common Multiplication and Division Situations) **Remarks/Examples:** **Examples of Opportunities for In-Depth Focus** When students work toward meeting this standard, they use a range of reasoning and representations to analyze proportional relationships.

MAFS.7.RP.1.1:	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2/1/4 miles per hour, equivalently 2 miles per hour.*
MAFS.912.G-GPE.2.6:	Find the point on a directed line segment between two given points that partitions the segment in a given ratio.
MU.68.S.3.2:	Demonstrate proper vocal or instrumental technique. **Remarks/Examples:** e.g., posture, breathing, fingering, embouchure, bow technique, tuning, strumming
MU.68.H.3.1:	Identify connections among music and other content areas and/or contexts through interdisciplinary collaboration. **Remarks/Examples:** e.g., school: other music classes, social studies, dance, physical education, science, health, math, world languages; community: cultural connections and traditions, ceremonial music, sales and advertising, communication
MU.912.S.3.5:	Develop and demonstrate proper vocal or instrumental technique. **Remarks/Examples:** e.g., posture, breathing, fingering, embouchure, bow technique, tuning, strumming
MU.912.H.3.1:	Apply knowledge of science, math, and music to demonstrate, through an acoustic or digital performance medium, how sound production affects musical performance. **Remarks/Examples:** e.g., acoustics, sound amplification, materials, mechanics