



YALE NATIONAL INITIATIVE

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Curriculum Units by Fellows of the National Initiative
2010 Volume IV: The Mathematics of Wallpaper

Patterns, a Different Point of View

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Being able to combine music and dancing in combination with the application of math concepts entices me to create a unit that would engage all students in my math classes. This unique way to present math, opens up a door for a different and innovating style of teaching mathematics. Math will not be any more a "secret" knowledge that only some students can access. Math will be accessible by all means to anybody that would try to learn. That is the intent of this curriculum unit; to provide a friendly environment for all students.

The relationship between *staff* in music and a *coordinate system* in Algebra and in Trigonometry provides the perfect field in which, we can describe geometric translations for music and for Algebra. Translations in music are called **transposition** and **time delay**, while in math they are called **vertical** and **horizontal translations**.

The unit also provides information on how to work with reflections over the lines $y = x$ and $y = -x$ and their use in graphing inverse functions. Reflections and rotations, and the symmetries of the square, are as well described as patterns used for dancing. All of these ideas will help to get students interested in math.

(Developed for Algebra II and Trigonometry, grades 10-12; recommended for Algebra II, grades 9-12, and Trigonometry and Pre-Calculus, grades 10-12)

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