

INTRODUCING MULTIPLE REPRESENTATIONS OF MUSIC INTO THE ELEMENTARY SCHOOL CURRICULUM

BY LARRY SCRIPP

AS CHILDREN BECOME ABLE TO MAKE REFERENCE TO MULTIPLE DIMENSIONS OF RELATIONSHIPS THEY CAN BEGIN TO SHOW COORDINATED AND GEOMETRICAL RELATIONS... IN MUSIC, THE ABILITY TO RELATE INDIVIDUAL PITCHES TO A HIGHLY STRUCTURED ORDER (THE MUSICAL SCALE) AND THE ABILITY TO COORDINATE THE REGULAR PULSE IN A VARIED PATTERN OF RHYTHMIC SURFACE DEMONSTRATE LEVELS OF INTEGRATION NECESSARY FOR AN ADVANCED KNOWLEDGE OF MUSIC.

—LYLE DAVIDSON, PERCEPTION OF MUSIC: SELECTED READINGS, 1994

The issue of representation is paramount in education. What educators take as evidence of learning depends to a large degree on the range of representation students are encouraged to employ as they learn. Schools that evaluate academic achievement primarily by a student's ability to reproduce memorized responses or procedures expressed within a single mode of expression on standardized tests will most likely teach only to this narrow view of learning. Schools that prepare students to find and solve complex, open-ended problems using several different strategies and modes of expression (verbal, visual, kinesthetic, etc.) will provide an education that requires multiple representations of knowledge within and integrated across the subject areas being taught.

Fortunately, many teachers today employ an expanded range of representations in teaching basic math and reading skills. Literacy programs benefit from teachers who require children to invent word spellings (testing the ability to construct reasonable, rule-based phonetic-based spellings) while, at the same time, asking students to recognize and memorize the spelling of 'sight word' lists (the ability to recognize words through their visual features). Early math programs now stress 'everyday' application of math by using coins, rulers and bead games to solve problems while, at the same time, employing abstract numeric, geometric or graphic representations of mathematical reasoning.

The study of music adds a new set of considerations for introducing a wider set of representations into the elementary school curriculum. Most obviously, the mere *presence* of conventional music programs in the elementary schools invariably injects a new symbol system (that is, music notation) into the school curriculum. To many teachers and students, the notation system functions mostly as a support for performing standard musical literature (often by memory) after extensive rehearsal. But, as the earlier cited *Champions of Change* report suggests, engagement with rhythm in the context of music notation promotes associated understanding of mathematical proportion or ratios that appear to bolster achievement in math tests.

The next essay provides a particular perspective on the *integration* of comprehensive, interdisciplinary music programs into

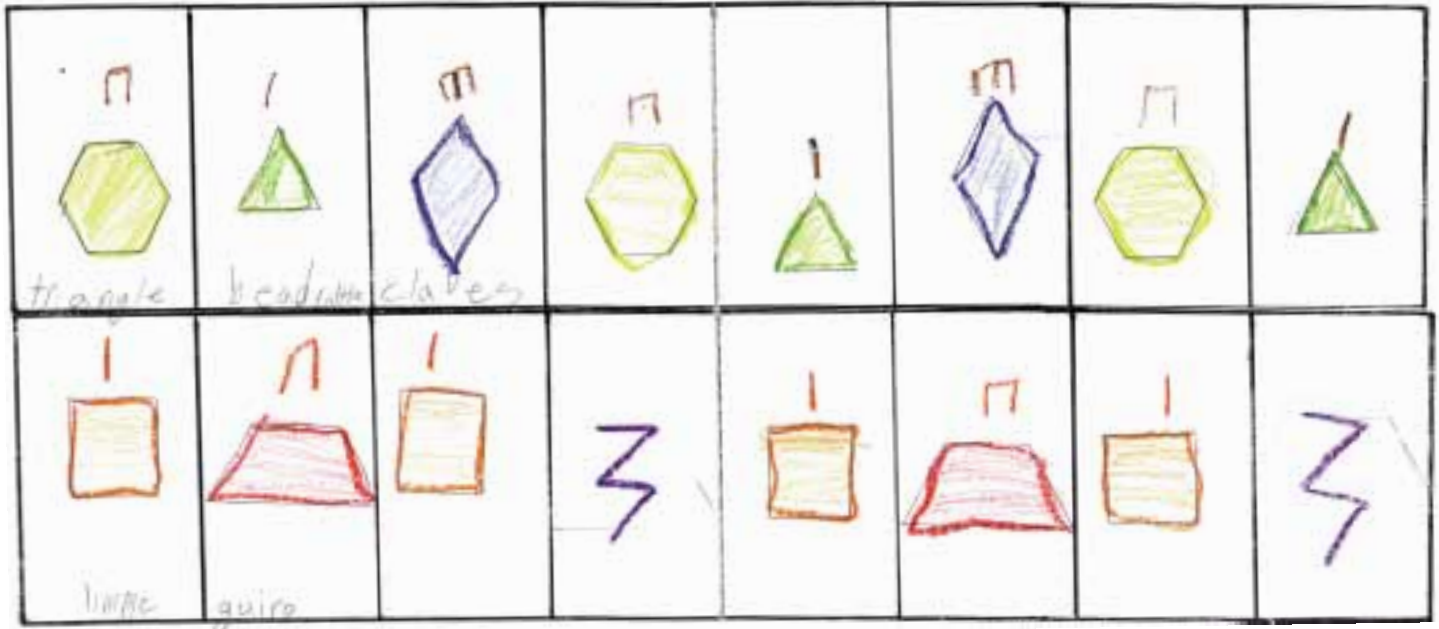


Often after singing a song, children enjoy the challenge of creating an invented representation of the song. Here a Conservatory Lab Charter School student invents a representation that captures the contour, notes, and phrasing of the tune "Twinkle, Twinkle, Little Star."

LTM 4/26/00 Making a Pattern Graph with Two Sounds
Playing at the Same Time!

Name: *Laigela King*

- Using the pattern blocks & working with a partner, build a new pattern with different shapes & colors!
- In the boxes below, copy your group's pattern. Be sure you use shapes in the top & bottom of the graph.



- Choose sounds for your pattern & write their names below!

bead drum / claves = triangle

Children use math manipulatives to make patterns that generate musical compositions in Learning Through Music classes. Once the pattern is set, the student can assign instruments and rhythmic figures to the geometric shapes. Some students elected to perform rhythms according to the number of sides of each geometric figure.

the elementary school curriculum. This particular type of integration can challenge children to explore varied representations of musical perception, composition, analysis, and performance. It also can stimulate children to make new connections among music, math, and science activities by encouraging them to probe into what Jeanne Bamberger terms "underlying conceptual structures and problem-solving strategies" shared among these disciplines. In other words, concepts embedded in musical activities and their representations can be used in elementary schools to facilitate new understandings of fundamental concepts (units, patterns, etc.), processes (measurement, analysis), and representational systems (that convey order, sequence, etc.) employed in other disciplines.

Fortunately, educators, such as those at The Conservatory Lab

Charter School, now are beginning to translate research in musical development into school practice (see Donald Hargreaves' Development in music, or Davidson & Scripp's Surveying the coordinates of cognitive skills in music which both appear in the *Handbook for Research in Music Teaching and Learning in Music*, ed. Colwell, 1992; also see Davidson & Scripp's Education and development in music from a developmental perspective, in *Children and the Arts: The Psychology of Creative Development*, ed. Hargreaves, 1989). This school serves as a laboratory for developing comprehensive, interdisciplinary public school practices that support a fully integrated view of musical, linguistic, and mathematical literacy. The Massachusetts Board of Education has chartered the school to provide such a program because its founding coalition and advisors are dedicated to creating a school community that

LTM Curriculum Projects are designed to explore *Fundamental Concepts and Processes Shared between Music and:*

- ✓ **MATH** (measurement, seriation, proportion, patterns, logical thinking, hierarchies, computation, etc.)
- ✓ **SCIENCE** (experimental methods, research skills, systems analysis, investigation & discovery, observation, metamorphosis, cause and effect, classification, etc.)
- ✓ **LANGUAGE** (character, theme, voice, dialogue, scene, decoding, inference, syntactical structure, poetic and dramatic forms, literature, prosody, reflective/creative/analytic/expository writing, etc.)
- ✓ **HISTORY/SOCIAL SCIENCE** (time line event ordering, diverse social perspectives, interpretation of events, understanding of diverse cultures, etc.)
- ✓ **ARTS** (composition, expressivity, form, character, color, design, movement, etc.)
- ✓ **EMOTIONAL/SOCIAL DEVELOPMENT** (self-discipline, self-esteem as learner, long-term pursuit, empathy, self assessment, peer and parent collaboration, etc.)
- ✓ **LEARNING SKILLS** (memorization, problem finding, problem solving, divergent thinking, self-reflection, systems thinking, analytical thinking, creative thinking, aesthetic awareness, etc.)

A document used to guide discussion and interdisciplinary curriculum design work in New England Conservatory's Learning Through Music teacher workshops.

embraces the belief that all pupils can benefit from musical instruction, from learning other subjects in conjunction with musical studies, and from a school culture which uses the process of musical growth as a model of learning in all subjects. Teachers in this school will be challenged continually to foster and/or observe *evidence of learning transfer* from musical skills across the curriculum. In particular, teachers and researchers will document closely the changes that occur in each child as music becomes the foundation for ever-increasing listening and observation skills, improved physical coordination, a more active imagination, increased powers of memorization, reading and interpretive skills — skills which may prove essential to the development of literacy in various disciplines, regardless of cultural background or initial proclivity for music. (From the abstract of the charter application to the Massachusetts State Board of Education for the Conservatory Lab Charter School which opened in September, 1999.)

Bamberger spells out criteria for authentic forms of integration possible among the subjects of music, math, and science. According to Bamberger, music-integrated projects should be shared across subject areas and the projects should “focus on principles that are functionally important in each domain” while also being respectful of “differing characteristics inherent in each” of the domains. These criteria point to the “two-way street” interdisciplinary model cited in the introduction, but they pose several challenges for teachers wishing to pursue with integrity the projects now being developed by New England Conservatory's Learning Through Music Partnership School Program. These challenges include: (1) underlying shared conceptual structures and strategies must be identified explicitly, (2) these structures must be understood as central to the understanding of each subject area, and (3) differences among the school disciplines be kept in mind in the design and implementation of each project.

In the first years of the Learning Through Music Partnership School Programs, teachers and Conservatory faculty have collaborated on Learning Through Music projects with these criteria increasingly in mind. While Jeanne Bamberger continues her research on her new computer-assisted curriculum projects, teacher and action researchers involved with Learning Through Music programs continue to find ways to support the notion and practice of fostering multiple representations of music that support learning in other disciplines.

A teacher using the TERC math programs at the Conservatory Lab Charter School, for example, reports that Kindergarteners participating in her pattern recognition projects were just as likely to glue matchsticks on paper to represent and perform rhythm patterns in music as they were to create abstract patterns (such as letters, geometric shapes, and other configurations). First and second graders in Lab School music classes were encouraged to construct invented notations of familiar songs to describe concepts of melodic contour and the relation of the parts of the song to the whole (see first figure). Later, they employed math manipulatives (geometrically shapes) to create music patterns that organized the musical rhythmic figures they would perform on percussion instruments (see second figure). And, in professional development sessions, teachers in Learning Through Music programs have had serious discussions about shared criteria for interdisciplinary curriculum design based on the fundamental concepts they identify and relate to state standards in music and academic subjects among all areas of the curriculum (see third figure).

As musicians, teachers, parents, administrators, and students in Learning Through Music School Programs understand better Jeanne Bamberger's views on how to use multiple representations of music to expand the range of mathematical and scientific understanding in schools, they will likewise realize a greater potential for music in education. ¶



Top: In visiting artist events at the Conservatory Lab Charter School, musicians become a part of a curriculum in which young children, using their invented notations, learned to participate in musical works they are about to hear. In this photograph, Boston Lyric Opera artist and New England Conservatory graduate student Geoffrey Scott visits an elementary school to demonstrate his musical skills and introduce children to a new opera by Philip Glass.

Bottom: By participating in a music-integrated school culture, children find many ways to participate with enthusiasm in all areas of the curriculum.

