

## **Infusing Mathematical Concepts Into A Music Curriculum Through A Multi-Sensory Approach**

### **Rationale**

Mathematical concepts are inherent in music making, music theory and music history. The infusion of mathematical concepts into the teaching of music can be actualized through a multi-sensory approach. Students will use auditory, visual and kinesthetic approaches by listening to music, looking at both traditional and non-traditional music scores and by taking on a number of kinesthetic actions during differentiated music practice and performance activities.

### **Develop Cognitive Skills through Music Practice, Theory and History**

1. counting the lines on the staff
2. identifying the time signature and counting the beats
3. counting the number of rests in a measure
4. distinguishing note values by clapping out, counting, gesturing, playing notes
5. identifying or counting the number of repeated notes
6. counting the notes in a chord
7. counting the number of chords in a composition
8. identifying and counting the number of key signature accidentals
9. identifying or counting the number of notes in different scales or modes
10. counting the number of words, lines, or stanzas in a song
11. counting the number of strings, keys, or pegs on instruments
12. counting the repetitions of a pattern of notes in a musical composition
13. counting the number of songs the student has learned
14. counting the number of instruments a student has played
15. counting the number of repetitions of a musical phrase in a composition
16. indicate an understanding of call and response patterns
17. participate in call and response patterns of a very simple nature using syllables or percussion.
18. counting the number of voices in a musical composition
19. counting or indicating the beats before an entrance
20. tallying the theme entrances of a round
21. demonstrating the entrances round
22. composing entrances for a round
23. creating and playing a minimum of two voices in a musical composition

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24. create an improvisation in a predetermined time frame;  
i.e. 30 seconds or one minute
25. counting the number of people in an ensemble
26. counting the number of pianissimos, fortes or other dynamic markings  
in a composition
27. understanding the mathematical concepts behind the rhythms of various  
styles by listening and clapping, using various instruments, singing in  
different styles including but not limited to pop, jazz and classical
28. planning original musical compositions based on numerical concepts
29. learning about the number of symphonies or other musical forms of a  
composer
30. identifying intervals, i.e. M3, P4, by singing, pointing, playing, counting on  
fingers, nodding
31. tallying the number of times a piece is practiced in a practice session
32. identifying the number of the finger used to play a note on the piano or guitar

### **Music Curriculum and Activities**

Students will demonstrate awareness, knowledge and comprehension of mathematical concepts by doing the following:

playing instruments (piano, guitar, pitched percussion, non-pitched percussion, etc.), singing, conducting, music history, music appreciation and music theory. Gesturing, clapping, writing out numbers, writing out various note values, responding to questions

matching key or time signatures, circling patterns or parts, circling identical key or time signatures, circling patterns or parts of chord progressions, circling identical measures or note patterns in a piece with identical mathematical concepts

improvising or composing pieces based on preset mathematical directives, (i.e. number of measures, time signature, number of sections, number of quarter notes etc.)

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### **Assessments**

checklists, worksheets, rubrics, logs and comments of teachers and paraprofessional, tracking of peer observation through a Mathematical Music Journal

### **Special Activities**

Student Assembly "The Magic of Math and Music Combined"

### **Differentiation of Learning Styles**

**Low functioning Students** - communicate about their acquisition of skills by gesturing, nodding, pointing, singing back syllables, clapping, tapping, stamping, striking/plucking musical instruments or surfaces

**Mid-Functioning Students** - counting up to 10, circling, matching parts of musical scores, playing or singing back music based on repetitions above the number 3 (i.e. four quarter notes), counting up or playing intervals of a M3rd to a M6th

**High Functioning Students** - all of aforementioned along with tallying numbers from ten to one hundred. Improvising and composing

### **Conclusion**

Through the use of differentiated and multi-sensory instruction, students will incorporate mathematical concepts into the study, practice and performance of music.