



Cross-Curricular Activities to Learn Math Integrating Math and The Arts



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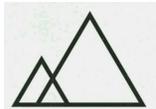
Rationale

- Mathematics learning can be enhanced for students with the implementation of The Arts
- It has been found that such integration increases student engagement in math, while elevating student interest and motivation in both academic learning and the arts
- Research concludes that this pairing of mathematics and the arts and its gains of greater sustained attention to lessons, leads to a more effective experience for learners to grasp mathematical concepts, while in a richer educational environment (Lindt & Miller, 2017)



Research Literature

- Moore and Linder (2012) argue that the arts are inherently connected to other domains of knowledge and must be utilized for richer learning
- Some educators advocate the use of visual arts in math, with the belief that by delivering mathematics through a meaningful artistic lens, students experience enriched learning in both the arts and math (Bush, Karp, Lentz, & Nadler, 2017)
- Educators who use the arts (e.g., drama for instance) as a guide for learning math can empower the learner into an active, creative role that strengthens student skills of collaboration and critique (Cotton & Toft, 2015)
- Research suggests that incorporating movement in the classroom has benefits on student learning and enhances engagement and interest “which supports greater sustained attention to lessons, allowing them to learn more effectively and commit concepts more easily to long term memory” (Lindt & Miller, 2017, p. 35)
- The integration of math and music into an educational fusion can provide a wider base of understanding between these two fields for both students and teachers, while producing creative options for instruction and learning problem-solving strategies (Noh & Huh, 2015)
- Listeners are often intuitively aware of musical elements while listening to music. However, it is difficult for many to identify and name these different dynamics. By having students explicitly identify and discern these elements, they are learning musical recognition (Hart, 2016)



Curriculum Connections

“The development of skills and knowledge in mathematics is often enhanced by learning in other subject areas. Teachers should ensure that all students have ample opportunities to explore a subject from multiple perspectives by emphasizing cross-curricular learning and integrated learning. In cross-curricular learning, students are provided with opportunities to learn and use related content and/or skills in two or more subjects. In integrated learning, students are provided with opportunities to work towards meeting expectations from two or more subjects within a single unit, lesson, or activity. By linking expectations from different subject areas, teachers can provide students with multiple opportunities to reinforce and demonstrate their knowledge and skills in a range of settings” (Ontario Ministry of Education, p. 26).

References

- Bush, S. B., Karp, K. S., Lentz, T., & Nadler, J. (2017). When venn diagrams intersect art and math. *Teaching Children Mathematics*, 23(7), 414-421. <http://www.jstor.org/stable/10.5951/teachmath.23.7.0414>
- Cotton, T., & Toft, H. (2015). Mathematics and drama. *Mathematics Teaching*, (247), 29-32.4. <http://mvaccess.library.utoronto.ca/login?url=https://search-proquest-com.mvaccess.library.utoronto.ca/docview/1722992308?accountid=14771>
- Lindt, S. F. & Miller, S. C. (2017). Movement and learning in elementary school: Integrating physical activity into elementary school lessons in reading, math, and other subjects can boost students' academic learning, while also helping them meet goals for physical education. *Phi Delta Kappan*, 98(7), 34.
- Moore, C. & Linder, S. M. (2012). Using dance to deepen student understanding of geometry. *Journal of Dance Education*, 12, 104-108. DOI: 10.1080/15290824.2012.701175
- Noh, J. & Huh, N. (2015). Integrating math and music: Teaching ideas. *Korean Society of Mathematical Education*, 19(3), 177-193. <http://dx.doi.org/10.7468/jksmed.2015.19.3.177>
- Ontario Ministry of Education (2005). *Mathematics*. Retrieved from <http://www.edu.gov.on.ca/eng/curriculum/elementary/math18curr.pdf>
- Hart, Vi (2016). Mixing Mathematics and Music. Retrieved from <http://vihart.com/wp-content/uploads/2016/08/Vi-Hart-Mixing-Mathematics-and-Music.pdf>

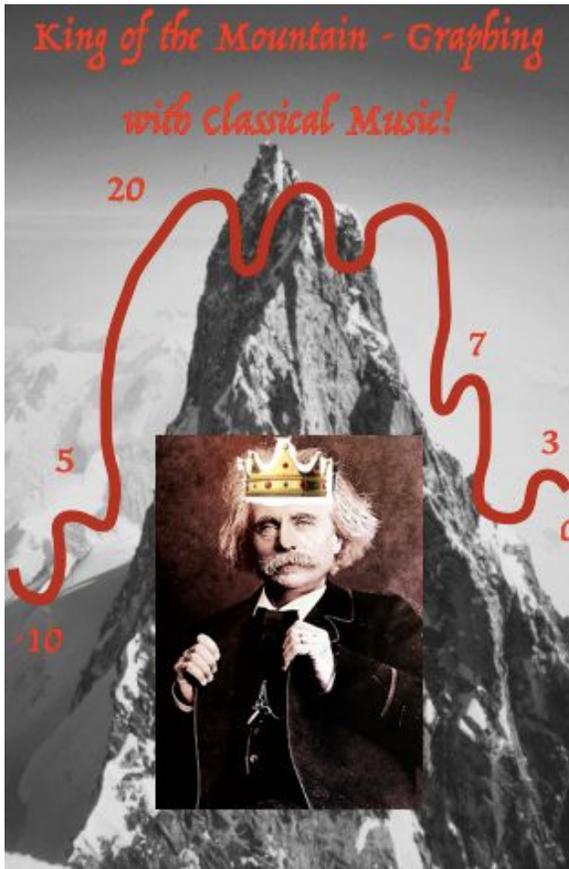




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Activity: King of the Mountain- Graphing with classical Music!



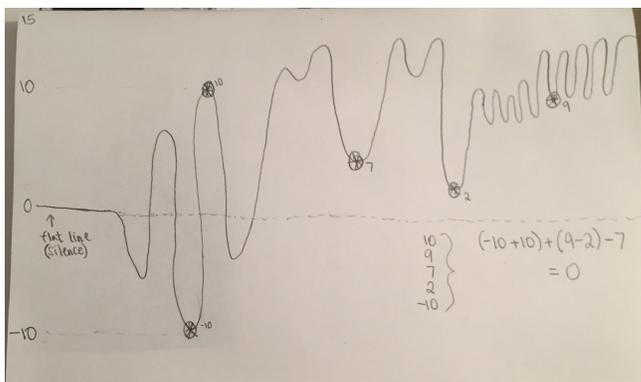
Math and Music:

- Graphing
- Equations (BEDMAS)
- Dynamics and elements of music

This activity can be used across elementary grades with simple modifications. For example, it can be used with primary grades by making the numbers range from 0 to 10, for junior grades the numbers can range from -10 to 10, and for intermediate grades the numbers can include decimals. The ways in which these numbers are used will also vary depending on the grade and students (addition, subtraction, multiplication, and/or division).

This activity can also extend to all of The Arts (visual arts, dance, drama). Students can walk their lines as a means of incorporating movement in this activity. It can also extend to a visual arts activity where students can add colour and elements of art to their mountain graphs. They can also create a skit that explains the journey of their line. This activity can extend to many mathematical concepts and all of the arts!

Example



Classical Music & Math Enrichment Games

Classical History, Exploring rhythm, tempo and reading the Elements of musical composition (counting, patterning, sorting and categorizing sound) <http://www.sphinxkids.org/index.html>

Playing with Pitch:

<http://creatingmusic.com/wom/about/>

Aural Training:

<http://creatingmusic.com/BlockGames/3x3/>

<http://www.flashmusicgames.com/notepair.html>

Concepts of Note Values & Duration:

<https://www.khanacademy.org/humanities/music/music-basics2/notes-rhythm/v/lesson-1-note-values-duration-and-time-signatures>

Musical and Visual Expressions of Mathematical Patterns (Vi Hart):

<https://www.khanacademy.org/math/math-for-fun-and-glory/vi-hart/singing/v/doodle-music>

