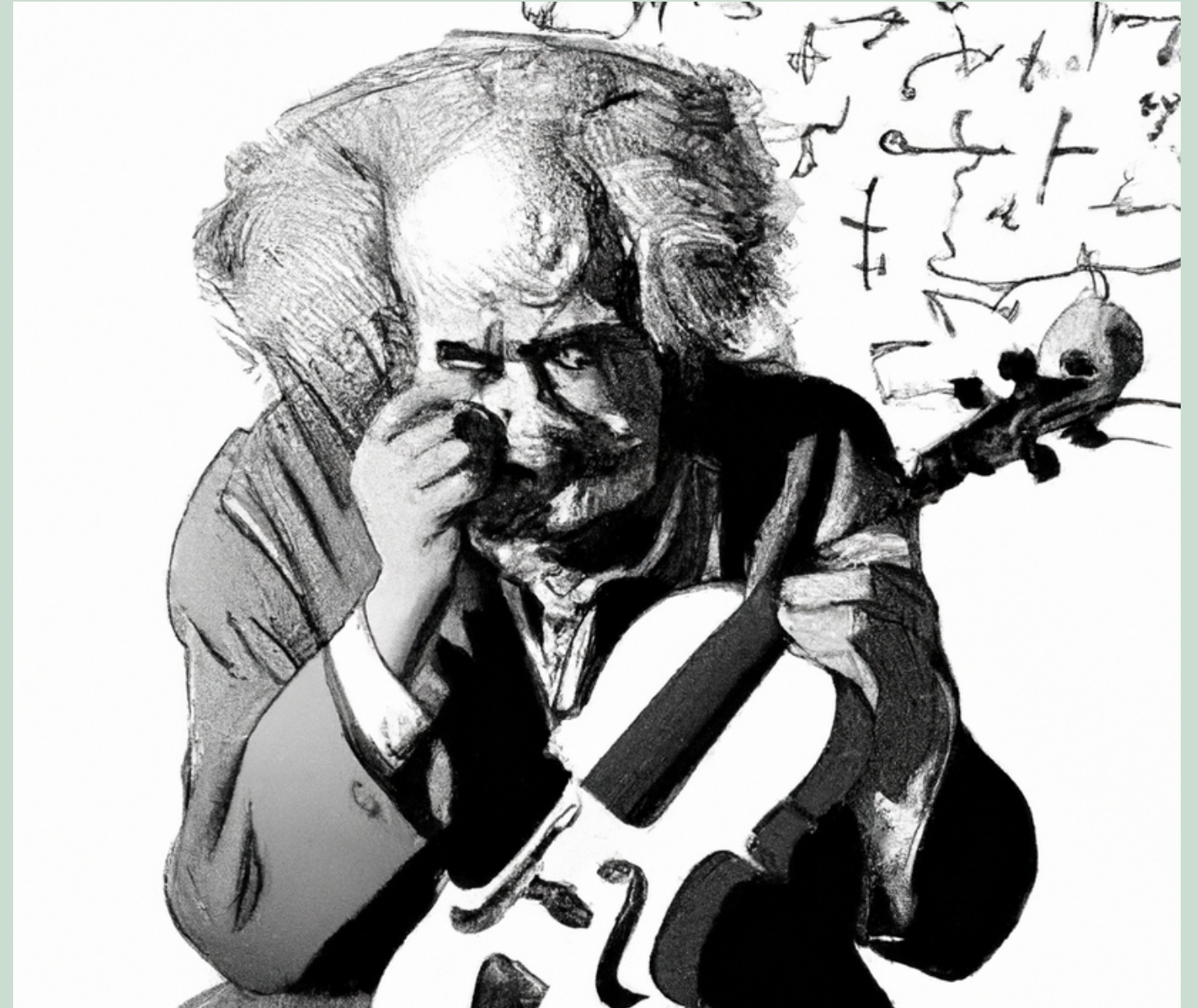


REAL CONNECTION BETWEEN MATH AND MUSIC



THE CONNECTION BETWEEN MUSIC AND
MATHEMATICS IS SO STRONG THAT
MUSICAL EXPERIENCES AND LEARNING
ENHANCE MATHEMATICAL
PERFORMANCE.
(LUIZ, 2007)

[HTTPS://WWW.RESEARCHGATE.NET/PUBLICATION/266318346_THE_LEARNING_OF_MUSIC_AS_A_MEANS_TO_IMPROVE_MATHEMATICAL_SKILLS](https://www.researchgate.net/publication/266318346_The_learning_of_music_as_a_means_to_improve_mathematical_skills)



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MUSIC CAN BE USED TO INCREASE
MATHEMATICAL KNOWLEDGE,
ACADEMIC PERFORMANCE AND
INTELLIGENCE IN GENERAL.
(KELSTROM, 1998)

[HTTPS://DOI.ORG/10.1177/0192636598082597](https://doi.org/10.1177/0192636598082597)



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PRACTICALLY FROM BIRTH, BABIES
START THINKING MATHEMATICALLY AND
MUSICALLY. SUBITIZING IS INSTANTLY
COUNTING WITHOUT COUNTING OUT
EACH ITEM. INFANTS SUBITIZE AT
THREE OR FOUR DAYS OLD.
(DENISON, 2014)

[HTTPS://ONWISCONSIN.UWALUMNI.COM/FEATURES/MUSICAL-NUMBERS/](https://onwisconsin.uwalumni.com/features/musical-numbers/)



AI GENERATED PHOTO: [HTTPS://LABS.OPENAI.COM](https://labs.openai.com)

CONCENTRATION AND CREATIVITY



ai generated photo: <https://labs.openai.com>



MAKING MUSIC IS A CREATIVE PROCESS
THAT GIVES JOY IN THE MAKING,
COMBINE MAKING MUSIC WITH SOLVING
MATHEMATICAL PROBLEMS AND THIS
CREATIVITY AND JOY WILL RUB OFF ON
THE PROCESS OF LEARNING MATH.
(HAMILTON, 2018)

[HTTPS://IEEEXPLORE.IEEE.ORG/DOCUMENT/8615262](https://ieeexplore.ieee.org/document/8615262)



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PHOTO: "BRAINS!" BY HEY PAUL STUDIOS IS LICENSED UNDER CC BY 2.0. CHANGES WHERE MADE

ART CAN AWAKEN ATTENTION IN THOSE THAT EXPERIENCE IT. MUSIC, RHYTHM AND CREATIVE MOVEMENT CAN HELP STUDENTS WITH THEIR CONCENTRATION ON CURRICULAR SUBJECTS.
(MOERMAN, 2018)

[HTTP://SH.DIVA-PORTAL.ORG/SMASH/RECORD.JSF?PID=DIVA2%3A1244292&DSID=-1240](http://sh.diva-portal.org/smash/record.jsf?pid=diva2%3A1244292&dsid=-1240)



STUDIES HAVE BEEN CONDUCTED TO PROVE THAT INCREASED MUSICAL EDUCATION HAS POSITIVE EFFECTS ON SOCIAL BEHAVIOUR, SELF-PERCEPTION AND MOTIVATION.
(MALL ET AL., 2016: 7)

[HTTP://MATHS.EMPORTFOLIO.EU/IMAGES/DELIVERABLES/TEACHER_HANDBOOK_ENGLISH_VERSION.PD](http://maths.emportfolio.eu/images/deliverables/teacher_handbook_english_version.pdf)

PRESENT ABSTRACT IDEAS IN CONCRETE FORM



DANCE CAN GIVE A VISUAL
REPRESENTATION OF MORE ABSTRACT
SUBJECTS IN MATH THAT ARE DIFFICULT
TO EXPLAIN IN PLAIN WORDS.
(ROSENFELD, 2011)

[HTTPS://WWW.ACADEMIA.EDU/4787544/JUMP_PATTERNS_PERCUSSIVE_DANCE_AND_THE_PATH_TO_MATH](https://www.academia.edu/4787544/JUMP_PATTERNS_PERCUSSIVE_DANCE_AND_THE_PATH_TO_MATH)



ai generated photo: <https://labs.openai.com>

THE INTEGRATION OF THE ARTS INTO TEACHING
GIVES STUDENTS MORE OPPORTUNITIES TO
MAKE CONNECTIONS THAT LEAD TO DEEPER
UNDERSTANDING.
(MUNROE, 2015)

[HTTPS://DOI.ORG/10.1177/1048371315572878](https://doi.org/10.1177/1048371315572878)



DANCE IS NOT THE RESULT OF MIMETIC
MOVEMENTS, BUT A COMBINATION OF
PERCEPTION OF SPACE, TIME, SYMMETRICAL
MOVEMENTS AND DIRECTIONS.
(BELCASTRO & SCHAFFER, 2011)

[HTTPS://WWW.TANDFONLINE.COM/DOI/ABS/10.4169/194762111X12954578042939](https://www.tandfonline.com/doi/abs/10.4169/194762111X12954578042939)



ai generated photo: <https://labs.openai.com>

PRESENT ABSTRACT IDEAS IN CONCRETE FORM



MUSIC IS ONE OF THE FIRST FORMS OF
COMMUNICATION AND IS OFTEN THE
FIRST CONTACT OF CHILDREN WITH
MATHEMATICS.
(GEIST & GEIST, 2008)



[HTTPS://WWW.PROQUEST.COM/DOCVIEW/197597007/FULLTEXTPDF/AD5A75E67FAE49AAPQ/1?ACCOUNTID=38978](https://www.proquest.com/docview/197597007/fulltextpdf/AD5A75E67FAE49AAPQ/1?accountid=38978)

"21 SYMMETRY" BY UPUPA4ME IS LICENSED UNDER CC BY-SA

2.0.

VISUAL REPRESENTATION



WHEN USING THE SPACE OF THE CLASS
ROOM AND THE NUMBERS WE HAVE
AROUND US WE CAN GIVE THE
CHILDREN A NEW LEVEL OF THE
UNDERSTANDING OF MATHEMATICAL
CONCEPTS
(MOERMAN, 2016)

[HTTP://ARCHIVE.BRIDGESMATHART.ORG/2016/BRIDGES2016-269.HTML](http://archive.bridgesmathart.org/2016/bridges2016-269.html)



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PHOTO: "DANCE" BY SCOTT ROBINSON, CHANGES MADE, [HTTPS://CREATIVECOMMONS.ORG/LICENSES/BY/2.0/](https://creativecommons.org/licenses/by/2.0/)



MUSIC GIVES A RANGE OF WAYS TO
UNDERSTAND MATHEMATICS AS
PATTERN BUILDING, COMPARING AND
ORDERING, DESCRIBING WHAT ONE
HEARS AND SEES AND SOLVE
PROBLEMS, MAKE MUSIC!
(JOHNSON & EDELSON, 2003)

[HTTPS://WWW.PROQUEST.COM/DOCVIEW/214139035](https://www.proquest.com/docview/214139035)



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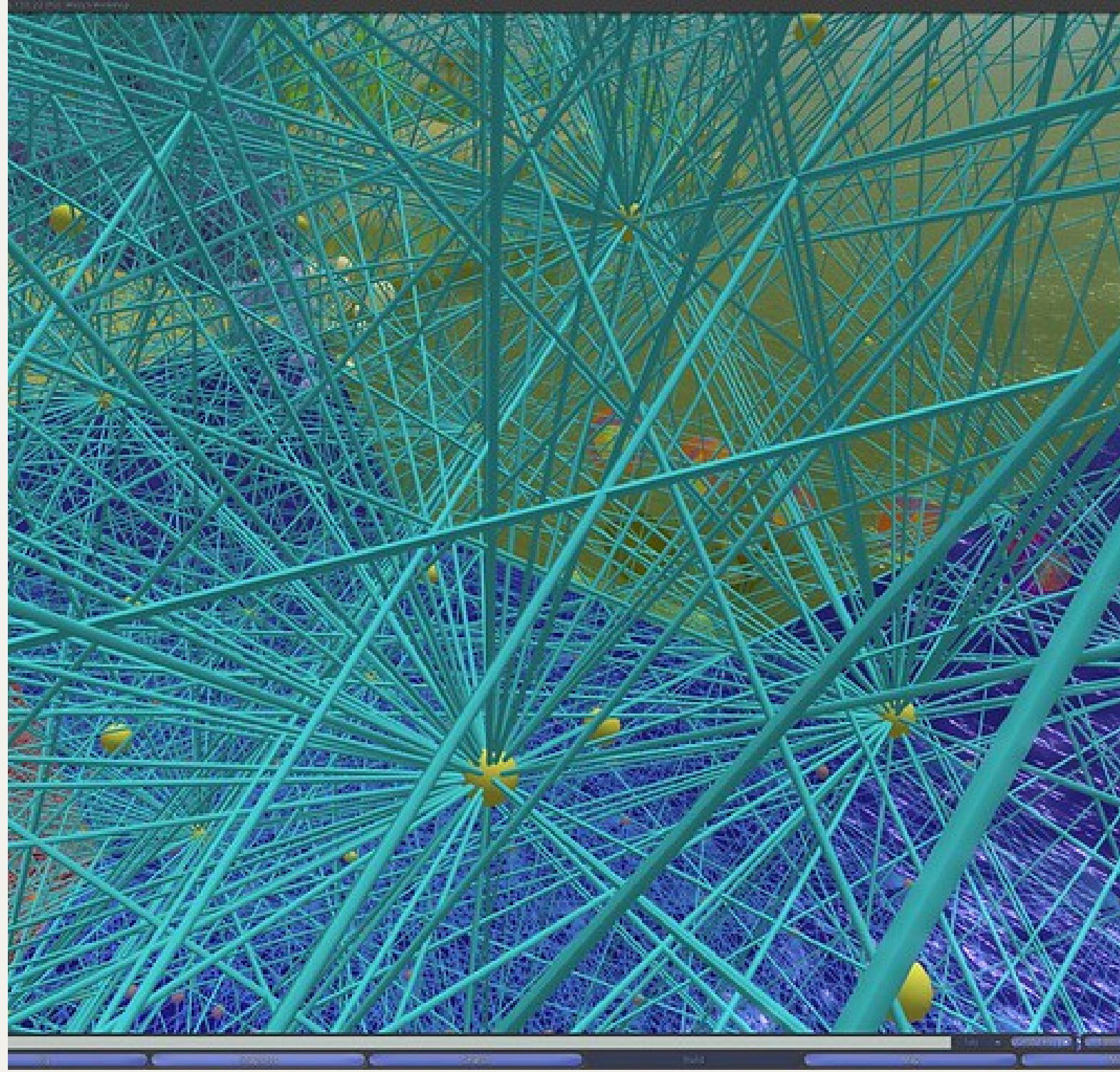


PHOTO: "REFLECTING LINES" BY SCOTT ROBINSON, CHANGES MADE.



DANCE AND CREATIVE MOVEMENT CAN
GIVE A VISUAL REPRESENTATION OF
ANGLES, GEOMETRIC FORMS AND
SPATIAL PERCEPTION.
(ROSENFELD, 2011)

[HTTPS://WWW.ACADEMIA.EDU/4787544/JUMP_PATTERNS_PERCUSSIVE_DANCE_AND_TH
E_PATH_TO_MATH](https://www.academia.edu/4787544/JUMP_PATTERNS_PERCUSSIVE_DANCE_AND_THE_PATH_TO_MATH)



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TEAM BUILDING/CLASS MANAGEMENT/INSPIRATION



PHOTO: "ANIMAL FARM" BY ONLY_ALIVE IS LICENSED UNDER CC BY-NC-ND 2.0.



THE USE OF BODY PERCUSSION AND
EURYTHMIC GAMES HELPS TO IMPROVE THE
INTEGRATION LEVEL OF ALL STUDENTS IN THE
WHOLE CLASS.
(LUNDBERG, 2014)

[HTTPS://LUP.LUB.LU.SE/LUUR/DOWNLOAD?FUNC=DOWNLOADFILE&RECORDID=4986216&FILEID=4986219](https://lup.lub.lu.se/luur/download?func=downloadfile&recordid=4986216&fileid=4986219)



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SOME TEACHERS TEND TO FOCUS ON THE ABILITY TO UNDERSTAND MATHEMATICAL CONCEPTS AND NEGLECT NEGATIVE MATHEMATICS DISPOSITIONS. INCORPORATING ART INTO THE MATHEMATICS CLASSROOM ARE SHOWN TO IMPROVE MATHEMATICAL DISPOSITION AND ALSO PERFORMANCE IN MATH. (AN ET AL., 2014)

[HTTPS://WWW.CIMT.ORG.UK/JOURNAL/AN.PDF](https://www.cimt.org.uk/journal/an.pdf)



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THE DISCIPLINE, CONCENTRATION AND
CLOSENESS IN DANCE CAN HELP STRENGTHEN
STUDENTS' SENSE OF EMPATHY, CO-
OPERATIONAL SKILLS AND RESPECT FOR ONE
SELF AND OTHERS.
(ROBINSON & ARONICA, 2018)

[HTTPS://IDEAS.TED.COM/WHY-DANCE-IS-JUST-AS-IMPORTANT-AS-MATH-IN-SCHOOL/?
UTM_SOURCE=FACEBOOK.COM&UTM_MEDIUM=SOCIAL&UTM_CAMPAIGN=SOCIA
L&UTM_CONTENT=2022-2-22](https://ideas.ted.com/why-dance-is-just-as-important-as-math-in-school/?utm_source=facebook.com&utm_medium=social&utm_campaign=social&utm_content=2022-2-22)



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"WOMAN AT PIANO AND CHILDREN WITH MUSICAL INSTRUMENTS. THE UNIVERSITY OF IOWA, FEBRUARY 22, 1938" BY THE UNIVERSITY OF IOWA LIBRARIES IS LICENSED UNDER CC BY-NC 2.0.



ART-THEMED MATHEMATICS EDUCATION
ACTIVITIES HAVE BEEN PROVEN TO INCREASE
TEACHERS' INNOVATIVE CAPABILITIES AND
STRENGTHEN THEIR PEDAGOGICAL SELF-
ESTEEM.

(AN ET AL., 2019)

[HTTPS://DOI.ORG/10.1080/15290824.2018.1472380](https://doi.org/10.1080/15290824.2018.1472380)



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"MUSICAL MOVEMENT (STAGE SIX)" BY CLAIR GRAUBNER IS LICENSED UNDER CC BY-NC 2.0.



IN INTEGRATED CLASSROOMS, WHERE MUSIC AND MOVEMENTS ARE USED COMBINED WITH MATHEMATICAL PROBLEM-SOLVING, GROUP DYNAMICS ARE BOOSTED AND CHILDREN BECOME MORE ACTIVE IN THEIR LEARNING PROCESS, MAKING THEM REACH CURRICULUM GOALS MORE EASILY.
(MOERMAN, 2016)

[HTTP://ARCHIVE.BRIDGESMATHART.ORG/2016/BRIDGES2016-269.HTML](http://archive.bridgesmathart.org/2016/bridges2016-269.html)



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OVERCOME LANGUAGE OBSTACLES/UNIVERSAL COMMUNICATION



PHOTO: "THANK YOU NOTE FOR EVERY LANGUAGE" BY WOODLEYWONDERWORKSIS LICENSED UNDER CC BY 2.0.



PHOTO: "COMMUNICATION" BY FLAVIJUS IS LICENSED UNDER CC BY-NC-ND 2.0.

STUDENTS LEARN TO COMMUNICATE ABOUT DANCE
THROUGH MATH AND MATH THROUGH DANCE.
(ROSENFELD, 2011)

[HTTPS://WWW.ACADEMIA.EDU/4787544/JUMP_PATTERNS_PERCUSSIVE_DANCE_AND_THE_PATH_TO_MATH](https://www.academia.edu/4787544/JUMP_PATTERNS_PERCUSSIVE_DANCE_AND_THE_PATH_TO_MATH)

DANCE IS SPEECHLESS BUT CAN GIVE AN EXTRA
DIMENSION TO THE COMMUNICATION WITHIN A
CLASSROOM. IN A MULTI-LINGUISTIC CLASS THIS CAN
HELP EASE THE LANGUAGE-OBSTACLES.
(MOERMAN, 2016)

[HTTP://ARCHIVE.BRIDGESMATHART.ORG/2016/BRIDGES2016-269.HTML](http://archive.bridgesmathart.org/2016/bridges2016-269.html)

OVER-BRIDGE ANXIETY/ MATH-PHOBIA



TO WORK WITH DANCE AND MOVEMENTS IN THE MATH CLASS ROOM CAN SOMETIMES MAKE THE KIDS FORGET THAT THEY ARE LEARNING MATH, AND HENCE THEIR PHOBIA OF MATH DISAPPEARS. THE SAME CAN BE TRUE FOR KIDS WITH A PERSONALITY THAT LIKES MATH MORE THAN DANCING AND MOVING, THE MATH MAKES IT EASIER FOR THEM TO JOIN IN ON THE DANCING.

(ROSENFELD, 2011)

[HTTPS://WWW.ACADEMIA.EDU/4787544/JUMP_PATTERNS_PERCUSSIVE_DANCE_AND_THE_PATH_TO_MATH](https://www.academia.edu/4787544/Jump_Patterns_Percussive_Dance_and_the_Path_to_Math)



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DANCE-THEMED MATHEMATICS EDUCATION
HELPED "IMPROVING STUDENTS'
DISPOSITIONS TOWARD MATHEMATICS AND
CREATING AN ENJOYABLE LEARNING
ENVIRONMENT FOR REDUCING
MATHEMATICS ANXIETY".
(AN ET AL., 2017)

[HTTPS://DOI.ORG/10.1080/15290824.2017.1299153](https://doi.org/10.1080/15290824.2017.1299153)



MUSIC, RHYTHM AND DANCE CAN HELP
CHILDREN FORGET ABOUT THEIR SOCIAL
ANXIETY AND ALSO THEIR FEAR OF NOT
UNDERSTANDING THE MATH THAT THEY
FEEL THEY ARE SUPPOSED TO
UNDERSTAND IN THE CLASS ROOM.
(MOERMAN, 2016)

[HTTP://ARCHIVE.BRIDGESMATHART.ORG/2016/BRIDGES2016-269.HTML](http://archive.bridgesmathart.org/2016/bridges2016-269.html)



"EXCELLENCE IN MUSIC AND MOVEMENT" BY
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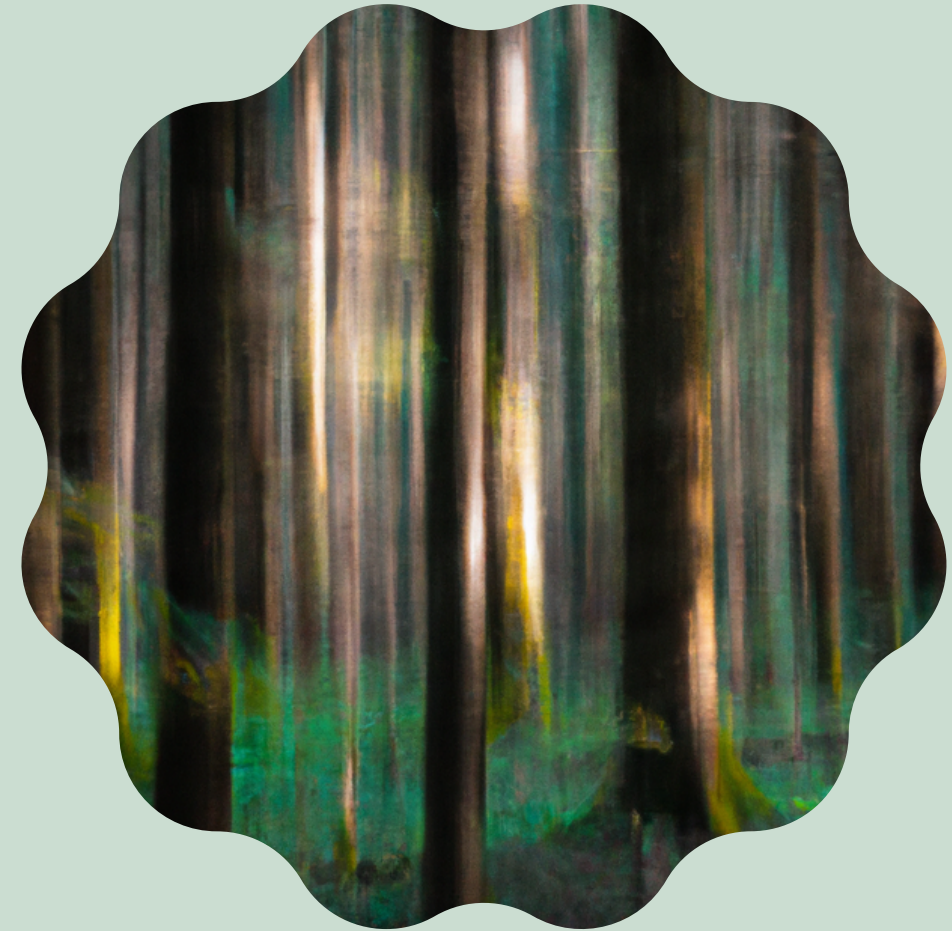


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MUSIC, WROTE THE GREAT 17TH-CENTURY
GERMAN MATHEMATICIAN GOTTFRIED
LEIBNIZ, "IS THE SENSATION OF COUNTING
WITHOUT BEING AWARE YOU WERE
COUNTING."
(DU SAUTOY, 2011)

[HTTPS://WWW.THEGUARDIAN.COM/MUSIC/2011/JUN/27/MUSIC-MATHEMATICS-FIBONACCI](https://www.theguardian.com/music/2011/jun/27/music-mathematics-fibonacci)



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MEMORISATION



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IT IS SHOWN THAT STUDENTS REMEMBER MORE THOROUGHLY WHAT THEY LEARN IF THEY GESTURE WHILE THEY ARE LEARNING. (COOK ET AL., 2008)

[HTTPS://WWW.SCIENCEDIRECT.COM/SCIENCE/ARTICLE/ABS/PII/S001002770700114X? CASA_TOKEN=AY335iOLFC4AAAAA:CALSDIDX_1Ri8HGd8NBjHqDB3UGTh0KqxxK8SdUqYG3-QF8P_2KY_YTVLMbBRD5SFSMPYUIPS4PV](https://www.sciencedirect.com/science/article/abs/pii/S001002770700114X?casa_token=AY335iOLFC4AAAAA:CALSDIDX_1Ri8HGd8NBjHqDB3UGTh0KqxxK8SdUqYG3-QF8P_2KY_YTVLMbBRD5SFSMPYUIPS4PV)

MOTIVATING, ENGAGING AND REWARDING



'MUSIC CAN ACTIVATE THE SAME REWARD CENTER IN YOUR BRAIN AS THE OTHER THINGS YOU ENJOY. REWARDING YOURSELF WITH YOUR FAVOURITE MUSIC CAN IMPROVE THE MOTIVATION YOU NEED TO LEARN NEW INFORMATION'.
(GOLD ET AL., 2019)

[HTTPS://DOI.ORG/10.1073/PNAS.1809855116](https://doi.org/10.1073/pnas.1809855116)





INTEGRATING MUSIC ACTIVITIES INTO
LEARNING ROUTINES ENABLES
CHILDREN TO DEVELOP LEARNING
EXPERIENCES IN A PLAYFUL AND
ENGAGING WAY.
(VAIOULI & FRIESEN, 2016)

[HTTPS://DOI.ORG/10.1080/00094056.2016.1150745](https://doi.org/10.1080/00094056.2016.1150745)



"DIA DE LOS MUERTOS ART BY CHILDREN" BY JUST SOME DUST IS LICENSED UNDER CC BY 2.0.



MUSIC CREATION IS THE ONLY ONE
THAT ACTIVATES MOST PARTS OF THE
BRAIN AS OPPOSED TO ANY OTHER
ACTIVITY.

(SCRIPP & GILBERT, 2016)

[HTTPS://DOI.ORG/10.1080/10632913.2016.1211923](https://doi.org/10.1080/10632913.2016.1211923)



PHOTO: "DESERT HEIGHTS" BY SCOTT ROBINSON. CHANGES MADE. [HTTPS://CREATIVECOMMONS.ORG/LICENSES/BY/2.0/](https://creativecommons.org/licenses/by/2.0/)