Reflections/Notes:

2011 - 2012 © ArtsNOW 100 Edgewood Ave, Suite 100 Atlanta, GA 30303 Phone: 404.688.2480 Fax: 404.688.2424

www.artsnowlearning.org

Idea Contributed by Emily Threlkeld



Curriculum guides provide differentiated ideas and activities aligned to a sampling of standards. The guides do not necessarily imply mastery of standards, but are intended to inspire and equip educators.



GRADES 3 - 5 Curriculum Guide

The Sound of Numbers

Form/Structure/Organization • Relationships • Patterns • Musical Notation • Rhythm • Fractions





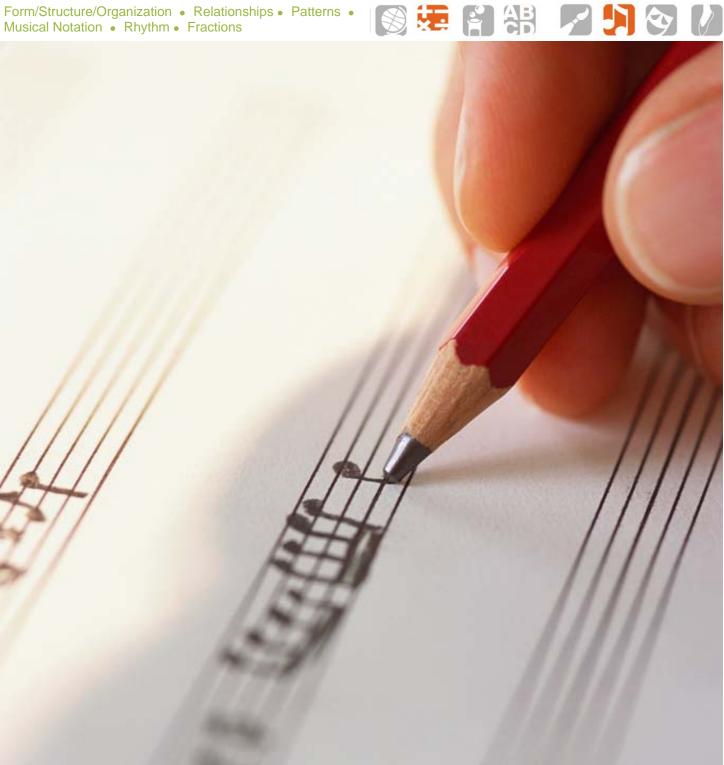












Explore rhythms, their notations and their sounds, in relation to patterns and measurements in math!





The Sound of Numbers

Using rhythmical experiences in music, the students will explore numbers and their relationships. Every aspect of music can be described mathematically. An understanding of patterns, the ability to develop operations, reveal functions, and being able to move toward higher levels of abstractions, can be strengthened through parallel music study. Dividing beats and meters: patterns; and starting the same patterns at different times to create canons: developing operations will be explored in this lesson.

Essential Question: What do numbers sound like "out loud"? How can we use sound and experience to deepen our math experience?

- Lead the class in a brief discussion about rhythm in music and how the division of beats and the organization and grouping of rhythms in music is mathematical.
- Start a demonstration of such divisions and organization with a four-level rhythmic
- Teach a four phrases using body percussion, with each phrase being comprised of eight beats.
 - 1st phrase sixteen eighth notes (snapping)
 - 2nd phrase eight quarter notes (clapping)
 - 3rd phrase thirty two sixteenth notes (patting)
 - 4th phrase four half notes (stamping)
- (Demonstrate for the students the traditional notation, by having it written out, or with manipulatives such as Knote Knacks®)
- Repeat as with each phrase being comprised of four beats, and then two beats.
 - 1st phrase eight, eighth notes (four, eighth notes)
 - 2nd phrase four quarter notes (two quarter notes)
 - 3rd phrase sixteen, sixteenth notes (eight eighth notes)
 - 4th phrase two half notes (one half note)
- Explore performing each pattern as a canon.
- Divide the class into four groups, one for each level of body percussion. Arrange them in order. Assign each level an instrument and have them perform as a layering of the rhythms.
- Finish by related the rhythmic performances to the mathematical applications.

Assessment

The students performance of the canon and the layering will indicate their success in understanding of the different divisions of the measures and phrases.

Materials

- Percussion Instruments
- White Board/Chart Paper
- Knote Knacks®

Vocabulary

Body percussion

Sounds produced by striking or scraping parts of the body; typically includes snapping, clapping, patting, and stamping

Unpitched percussion

Percussion instrument whose sound is typically produced by shaking, striking, or scraping and does not produce a specific pitch; includes shakers (maracas), drums (bongos, hand drums, congas), woods (claves, rhythm sticks, woodblocks, etc.), and metals (triangle, cowbell, finger cymbals)

Canon

Piece of music where one voice repeats the part of another, throughout the whole piece

Phrase

A single line of music played or sung. A musical sentence.

The speed at which a music piece is performed Measure

The unit of measure where the beats on the lines of the staff are divided up into two, three, four beats to a measure.

Reat

A unit of measurement in rhythmic time

Rhythm

Combinations of long and short, or even or uneven sounds that establish a musical continuum and convey a sense of movement.

Note Value

the relative duration of a musical note.

Half Note

A note having the time value of two quarter notes or half of a whole note, represented by a ring with a stem.

Quarter Note

A musical note having the time value of a quarter of a whole note or half a half note.

Quarter Note Rest

A rest or break from playing for the duration of a quarter note.

Eighth Note

A note having the time value of an eighth of a whole note or half a quarter note, represented by a large dot with a hooked stem.

Sixteenth Note

A note having the time value of a sixteenth of a whole note or half an eighth note, represented by a large dot with a two-hooked stem.

Classroom Tips

The summarization of the mathematical operations involved in this activity include division of beat into eighth and sixteenth notes; elongation in half notes: total number of beats per phrase in a four-beat pattern (16), in a twobeat pattern (8), in a one-beat pattern (4); totals counting repetitions of phrases - 16x2, 8 x 4, 4 x 8. and so on. Text can be added for each rhythm as well, as in: Apple, pear, pomegranate, plum.

Georgia Performance Standards

M3N3: Students will further develop their understanding of multiplication of MATHEMATICS whole numbers and develop the ability to apply it in problem solving. M3N4: Students will understand the meaning of division and develop the ability to apply it in problem solving.

M3N5: Students will understand the meaning of decimal fractions and common fractions in simple cases and apply them in problem-solving

M3A1: Students will use mathematical expressions to represent relationships between quantities and interpret given expressions.

M3P3: Students will communicate mathematically.

M3P4: Students will make connections among mathematical ideas and to other disciplines.

M3P5: Students will represent mathematics in multiple ways.

M4N4: Students will further develop their understanding of division of whole numbers and divide in problem solving situations without calcula-

M4N6: Students will further develop their understanding of the meaning of decimal fractions and common fractions and use them in computations.

M4P3: Students will communicate mathematically. M4P4: Students will make connections among mathematical ideas and to

other disciplines. M4P5: Students will represent mathematics in multiple ways.

GRADE 5

M5N3: Students will further develop their understanding of the meaning of multiplication and division with decimals and use them.

M5N4: Students will continue to develop their understanding of the meaning of common fractions and compute with them.

M5P3: Students will communicate mathematically.

M5P4: Students will make connections among mathematical ideas and to other disciplines.

M5P5: Students will represent mathematics in multiple ways. MUSIC

GRADE 3

M3GM.2: Performing on instruments, alone and with others, a varied repertoire of music

M3GM.3: Reading and notating music

M3GM.5: Composing and arranging music within specified guidelines

M3GM.8: Understanding relationships between music, the other arts, and disciplines outside the arts

GRADE 4

M4GM.2: Performing on instruments, alone and with others, a varied repertoire of music

M4GM.3: Reading and notating music

M4GM.5: Composing and arranging music within specified guidelines

M4GM.8: Understanding relationships between music, the other arts, and disciplines outside the arts

GRADE 5

M5GM.2: Performing on instruments, alone and with others, a varied repertoire of music

M5GM.3: Reading and notating music

M5GM.5: Composing and arranging music within specified guidelines M5GM.8: Understanding relationships between music, the other arts, and

disciplines outside the arts

Common Core Georgia Performance Standards

MCC3.OA.1: Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5×7 .

MCC3.OA.2: Interpret whole number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.

MCC3.OA.3: Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

MCC3.NF.1: Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b.

MCC3.NF.3: Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

GRADE 4

MCC4.OA.1: Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.

MCC4.NF.1: Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n$ x b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent frac-

MCC4.NF.2: Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. GRADE 5

MCC5.OA.1: Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.

MCC5.OA.2: Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 x (8 + 7). Recognize that $3 \times (18932 + 921)$ is three times as large as 18932+ 921, without having to calculate the indicated sum or product.

National Standards

Standard 2: Performing on instruments, alone and with others, a varied repertoire of music

Standard 5: Reading and notating music.

Standard 6: Listening to, analyzing, and describing music.

Standard 8: Understanding relationships between music, the other arts, and disciplines outside the arts.