Lesson Title:

Rhythmic Equations

Big Idea & Learning Objectives

1.Students will be able to understand that rhthym is a combination of notes and rests.
2.Students will understand that each note and rest is part of a whole measure of music and that the time signature tells them how many beats equal one whole measure.
3.Students will make connections between the parts and wholes of a muscial composition and parts and wholes in the number system.
4.Students will understand how two different rhythms can be combined to equal the same number of beats.
5.Students will compare and contrast “musical equations” found in phrases of music.

Content Area & Arts Discipline:

Math & Music

Overview of the Lesson

The teacher will review fractions with the students. Students will understand through musical compositions that different fractions can add up to one whole. Students create rhythms that showcase not only their knowledge of mathematical concepts, but also their ability to manipulate that knowledge into something new and creative in musical application.

Grade Level:

Fourth or Fifth Grade

Procedures

Engaging Students (“The Hook”):

The teacher will engage the students by showing them two measures of music, both with four beats to a measure, one made up of half notes and one made up of quarter notes. He/she will then ask the students to compare the two measures. Which one has a greater number of beats? The teacher will guide students into the realization that each has an equal number of beats the beats are just broken into a different number of parts.

Proposed Time Frame:

2 hour (2 class periods)

Building Knowledge:

Together make a chart of common things that can be broken into different numbers of pieces but still have the same sized whole. Why do we break things into different numbers of pieces? Would you ever break a whole up into different sized pieces? What is the purpose of putting different kinds of notes into a musical composition? Are all pieces of music broken up so that they have the same size parts in each measure? Guide students to realize that combining different sized pieces(notes and rests) helps to create a rhythm. Without a rhythm, music wouldn't exist. Smaller pieces make the rhythym faster (eighth notes versus quarter notes). The speed of the beat is the tempo. Mixing up the types of notes can creates different types of rhythms: bouncy, galloping, smooth, etc.

Date Lesson Created:

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Modeling the Experience:

•Begin with simple rhythms the students know. Clap a 4-beat pattern of quarter notes (ta, ta, ta, ta) and then a 4-beat pattern of eighth notes (ti-ti, ti-ti, ti-ti, ti-ti). Ask students to repeat clap each of those lines.

• One students are comfortable clapping all types of notes add symbols for the notes. Have a student volunteer draw pictures of the notes when you clap a rhythm.

•Form equivalent fractions by splitting the class in half have one half clap a beat using quarter notes while the other half does eighth notes. Ask the students how many eighths equal one quarter. Continue with other clapping and recording patterns.

•Begin to mix up the two rhythms in your model clap (ta, ti-ti, ti-ti, ta) and have them echo back a few of these as well.

•As students gain confidence, add two more rhythms to the mix: a half note (ta…aa) and a rest (just open up your hands for one beat) and have them echo back.

•Now have students create rhythms with a combination of these notes and beats to match a teacher created rhythm.

•Choose a model student who you feel would be good at this activity. Tell them that you are going to clap a rhythm while the rest of the class whisper-counts to 4. When you are finished, the student will clap an answer ,which must take place while the class whisper-counts to 4, and the answer must be different than the teacher's question. IE: Teacher: ta, ta, ti-ti, ta Student: ti-ti, rest, ta, ta

•Allow each student to practice this (may take several tries).

• Now for the equations: Write the beat counts on the board for a teacher rhythm (IE: ta, ta, ti-ti, ta would be written 1 + 1 + 1/2 + 1/2 + 1) and ask students to find the answer (4). Then, do the same thing for a student "answer" rhythm. Ask them to find the answer for that equation (should also be 4). (Fourth grade focuses on adding fractions with the same denominator, while fifth grade can extend this to unlike denominators.)

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Applying Understanding:

•Students will create and record their own rhythms using body percussion.

•Students will compare their rhythms with that of a classmate.

•Students create equations for phrases of their musical compositions.

Room Requirements & Arrangement: **classroom** **-large open space** **-uncluttered** **-carpet/rug**	**Opportunities for Reflection (Closing):** •Students will change their musical composition into a a series of bar models representing fractions. •Students will use teacher created flashcards and staff paper to create rhythms for given fractions and equations.
Material Equipment: **● smart board/chart paper and markers** **● index cards** **● staff paper**	**Assessing the Learning:** The teacher will observe students as they work in groups to analyze their understanding of whole-part relationships and musical composition. The teacher will grade student bar models and recorded rhythmic examples.

Resources:

-Elements of Music sheet

Standards & Principles

State Content Standards:

4NF.1 Explain why a fraction a/b is equivalent to a fraction (nxa)/(nxb) 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 fractions.
4NF.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.
4.NF.3 Understand a fraction a/b with a > 1 as a sum of fractions 1/b.
4.NF.3a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
4.NF.3b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.

Arts Standards:

Music Arts

MMI2b Improvise rhythms and accompaniments by playing instruments.
MMI2c Create and notate an original musical composition.
MMI3b Identify the characteristics of a music composition.
MMI5 Read from music notation that includes treble clef pitches, basic rhythm notation (including sixteenth, eighth, quarter, half, and whole notes with corresponding rests), basic meter signatures...
MMI5a Understand counting, playing, or singing from increasingly difficult musical notation such as syncopation.
MMI5b Demonstrate knowledge of melodic, rhythmic, and dynamic notation.

Vocabulary: ● **fraction** ● **mixed number** ● **whole, parts** ● **numerator/denominator** ● **bar, time signature, measure** ● **rhythm, beat, notes, rests** ● **phrases** ● **tempo** ● **equation**	**Principles of Universal Design for Learning**: I. Provide Multiple Means of Representation 2.5 Illustrate through multiple media. 3.4 Maximize transfer and generalization II.Provide Multiple Means of Action and Expression 6.3 Facilitate managing information and resources 6.4 Enhance capacity for monitoring progress III.Provide Multiple means of engagement 7.2 Optimize relevance, value, and authenticity. 8.3 Foster collaboration and community.
	Appendix **Extended Learning Activities:** **Ways to Adapt:** --Extensions: You can extend this by sharing that the questions and the answers all create the same end result. Work backwards and have students create rhythmic compositions to traditional math equations. You can use this to show muliplying a fraction by a whole number, dividing fractions, convert to decimals, etc.