Music is Math – The Kathak Clock (Movement & Music)

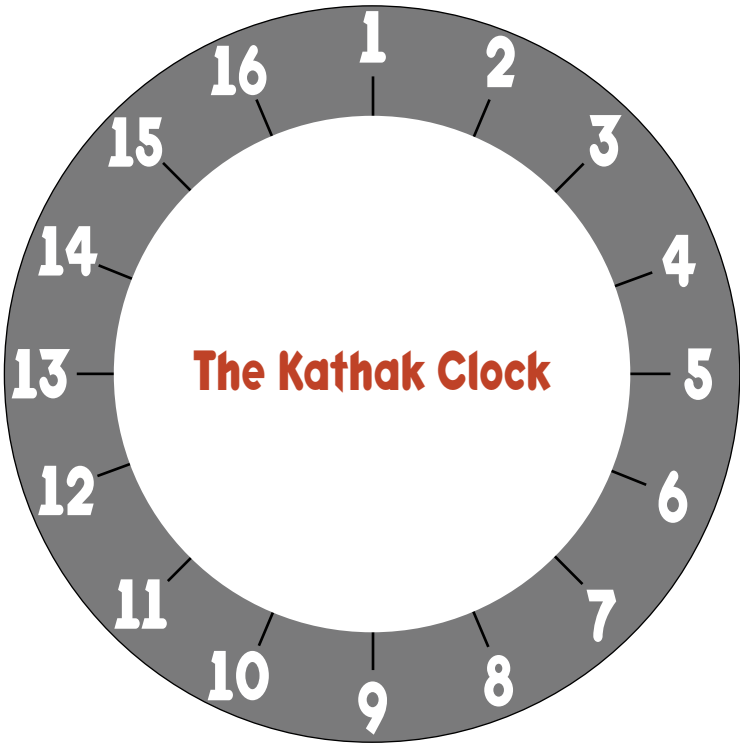
Rhythm, like so many aspects of time, around the world, is better visualized as cyclical rather than linear, and this includes North Indian Classical Music, also known as Hindustani music. In the music of Kathak, the rhythm moves in a circle like a clock, beginning with one and ending on one. The cycles of beats are called a tal, or tala. These cycles are foundations upon which rhythmic patterns are built. The musicians and dancers overlay various rhythms on top of this foundation, creating a complex, polyrhythmic sound. A common cycle (tala) is Teental, which is a 16 beat tala. Dancers and musicians count the beat on the hand using claps and open palms to denote the divisions in the cycle. This is a complex rhythmic system, rigid, yet allowing polyrhythmic improvisations to happen.

Students can better understand this concept by drawing a diagram similar to a clock.

Part 1 – Grades K and up
Notice the 16 divisions on the circle, like a clock with the numbers shifted around so that the first number is at the top, rather than the last number.

Have the students count starting with one and ending on one, not on 16. Indian compositions nearly always end on one.

As an option, students can count in Hindi (the national language of India) 1 through 16 as follows:
Ek, do (as in doe a deer), teen, char, paunch, che (rhymes with hey), saut, (rhymes with not), aut, no, dus (dust minus the t), gyarah, barah, tairah, chaudah, pundra, sola.



Part 2 - Grades 3 and up
Here is a chance to create a special type of composition called Tihais (pronounced tea-hiz). This is a special rhythmic pattern that repeats itself three times.
We can start by asking the students to solve the following equation. There are many ways to solve it!

(The Kathak Clock, continued)

Equation: a+b+a+b+a=16

One example of this is where a=4 (beats) and b=2 (beats) 4+2+4+2+4

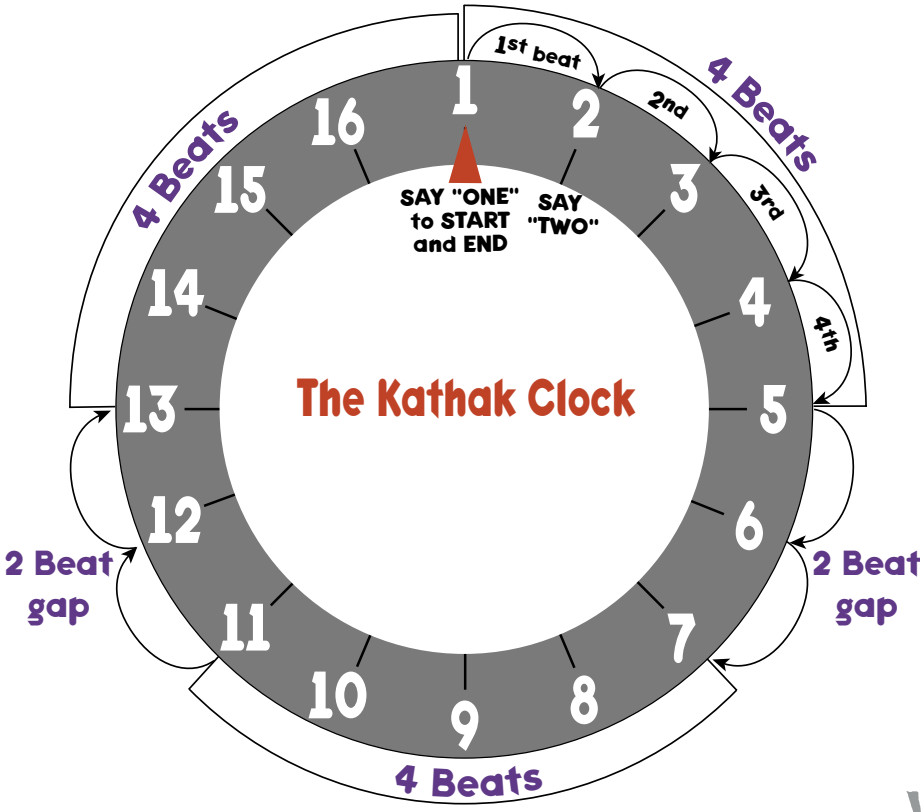
a and b can equal any positive number

To vocalize our example solution in music, have the students count starting at the top of the clock. The numbers in the "a " group will be the vocalized beats, and the numbers in the "b" group will be gaps or rest beats.

Students should count out loud the numbers in the "**a**" group, and whisper the numbers of the "**b**" group. While the number one marks the beginning and the end of the cycle, it does not count as the first beat. This is because beats are counted by the intervals between each number. The "1"acts like the starting gun in a race; it functions to start and end the cycle. (See Q1 below)

To execute the example above vocally, just one time around the clock, they would speak as follows, with "a" numbers spoken and "b" numbers whispered.

Spoken aloud 1 2 3 4 5 7 8 9 10 11 13 14 15 16 1
Whispered 6 12



An example

(The Kathak Clock, continued)

Common questions:

Q: Why is there only one number (6 or 12) that represents a two-beat rest?
A: Because it takes one beat to get from 5 to 6 and another to get from 6 to 7. We are counting the intervals between the beats as 2; therefore it is a 2 beat rest.

Q: Why do we count 1 at the beginning and the end?
A: In this type of music, 1 is really like "go" when spoken at the beginning and "stop" when spoken at the end.

Q: What happens if I want to do my cycle more than once around the clock? Do I count 1 twice, once to end the first cycle and once to begin the second?
A: No, that would add an extra beat! You count 1 only once, but it should go immediately into the second cycle without a pause. It helps to gear up as you're coming up to it, knowing that you are about to start another cycle, and emphasizing the 1 that way. And remember, when you come to the end of your last cycle, you must end on 1!

Students are welcome to use fractions to solve this equation, however these will be more difficult to vocalize, as they encounter subdivisions of the musical beats. They would have to vocalize "1 & 2& 3&" etc, if they are to include halves, and "1 e & a 2 e & a" etc if they are to include quarters in their equation.

As you can see, Hindustani music is very complex. This cycle of 16 is only one of many cycles used. Here we have not begun to address the subdivisions of beats, which layer on more complexity and beauty to both the music and the dance form. You can see why people study for years and years to learn this style of dance!

Online: www.worldartswest.org/plm/guide/activitypages/movemusic/musicismath.shtm