



Muse Machine 2018 ATTS-Inspired Lesson Plan

What's That Rhythm's Shape?

Developed by Corrinne Fischer

Northmont High School, Dayton, OH

Lesson Plan Summary:

Drawing a correlation between math and the arts is often seen as difficult, if not impossible. Not so for math teacher Corrinne Fischer from Northmont High School in Dayton, Ohio. She is not only an accomplished teacher of senior-level math, but plays the trumpet with care and enthusiasm. Additionally, she grasps the ways that technology can be used to engender an understanding of how math and music fit together. Thus, inspired by a presentation by artists from Jazz at Lincoln Center during Muse Machine's Summer Institute 2018, Corrinne created an engaging lesson for her students that ties the rhythms of jazz to the patterns of geometry. The website mathsciencemusic.org led Corrinne to the creative tool "Groove Pizza." It is a circular rhythm app for creative music making and a tool for creating *grooves* using math concepts like shapes, angles and patterns. Students liked the lesson so much that they asked to continue beyond the time allotted. Many teachers only dream of such classroom engagement!

Name	School	Subject	Date
Corrinne Fischer	Northmont High School	Geometry	November 30, 2018
Inspiration	Throughout the Muse Machine Summer Institute 2018, we kept turning back to the basics. Whether it was after an intense historical lesson or before a jam session, the Jazz at Lincoln Center artists would review the four basic jazz rhythms. (Stomp Clapp, Clave, Swing and Shuffle) In Geometry, we often do the same thing by going back to the basics. Geometry is unique because it is extremely visual. When I found the website mathsciencemusic.org and its <i>Groove Pizza</i> , I was hooked. I now had an easy visual to help everyone connect their geometric knowledge with the rhythms of jazz.		
Title	What's That Rhythm's Shape?		
I. <u>OVERVIEW</u>	<p>A. Summary: After practicing the different jazz rhythms discussed at Summer Institute, visualizing them with www.mathsciencemusic.org's <i>Groove Pizza</i>, and discussing the mathematics within the figures, students will create their own rhythms and the Geometry within them.</p> <p>B. Standards:</p> <p><u>G.CO.2</u> Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not, e.g., translation versus horizontal stretch</p> <p><u>G.CO.5</u> Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using items such as graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.</p> <p><u>G.CO.10</u> Prove and apply theorems about triangles. Theorems include but are not restricted to the following: measures of interior angles of a triangle sum to 180°</p> <p>C. Objectives/Outcomes:</p> <p>Students will be able to clap the four basic jazz rhythms.</p> <p>Students will be able to identify the geometric shapes and transformations within the different rhythmic patterns.</p> <p>D. Teaching Approach: Discovery learning, group work and presentations</p> <p>E. Assessment: Classroom monitoring, group presentations.</p>		
II. <u>LESSON PREPARATION</u>	<p>A. Teacher Needs:</p> <p>a. Teacher Information: Google Slides presentation, premade <i>Groove Pizza</i> site,</p>		

	access to technology
	b. Helpful Hints: I spent a lot of time just playing around with <i>Groove Pizza</i> so I would be more familiar with it. I should have made a little tutorial sheet (how to start over, how to play only one “ <i>Pizza</i> ” instead of four, etc.).
	B. Student Needs: Device, headphones
	a. Prior Knowledge: Rhythmic knowledge will be helpful, knowledge of the four geometric transformations (translation, reflection, rotation, and dilation) as well as how to name polygons and find the sum of the measures of their interior angles.
	b. Student Voice: Students are able to create their own rhythms and use whichever type of music they prefer from the five options.
	c. Vocabulary: stomp-clap, swing, shuffle, clave, translation, reflection, rotation, and dilation, interior angles, polygon.
III. <u>EVIDENCE/ASSESSMENT OF OUTCOMES</u>	Students will be making presentations and submitting them to Google Classroom. They will be given a rubric as well as the assignment description via Google Classroom.
IV. <u>ENDURING UNDERSTANDINGS</u>	Mathematical patterns can be observed throughout music, art, and all areas of life.
V. <u>LEARNING PLAN</u>	A. Prompt: PowerPoint presentation.
	B. Hooks: As students enter the room, <i>Take the A Train</i> , will be playing. We will start having a discussion about what they hear and the music will start and stop. I will continue the discussion as if nothing happened.
	C. Essential Question(s): Which is better, seeing or hearing?
	D. Resources: Groove Pizza, Google Slides or other presentation software
	E. Teacher and Student Performance Tasks: As the students were finishing up their quiz, I turned the song <i>Take the A Train</i> on over the speakers. Most students noticed, but continued their work as it played quietly. After a discussion about “what if you couldn’t hear that?” I told the students that we would be visualizing music. I then showed them visualizations from www.mathsciencemusic.org ’s <i>Groove Pizza</i> of the four basic jazz rhythms we

	<p>discussed at Summer Institute, stomp-clap, clave, swing and shuffle and asked for any observations. Most were not mathematical, so I prompted the students to think about the shapes they were seeing and how they compared to one another. After visualizing each rhythm, I asked them to act it out; physically stomp-clapping, listening and repeating the clave rhythm, or playing along with the cabinet routine and wiping your hands of for the shuffle. Once these conversations settled, I showed the students the images again with their names and also played them on Groove Pizza. Modeling the proper geometric shape names as well. Students were then asked to access Groove Pizza and create their own rhythms. They were given specific requirements to include at least one of the four jazz rhythms, state the proper name of each polygon they made, find the sum of the interior angles of their polygons, state any transformations that applied to congruent or similar polygons as well to include a screenshot and link to their Groove Pizza in their final presentation.</p>
	<p>F. Final Review: The students showed me they were able to use Groove Pizza effectively by creating their presentations and applying the Geometry skills above on the additional slides or in the comments section.</p>
<p><u>VI. LESSON REFLECTION</u></p>	<p>Overall the lesson went well. My students really enjoyed doing something a little different and even asked for more time for the project. I didn't originally have a rubric and had to answer a few questions, but this lesson was more for fun and less for a grade anyway. Similarly, I didn't require the students to act out every rhythm, but I should have. I should have waited to post the link to Groove Pizza as some students were messing around with it early. I also included in the helpful hints, that next time I will have a cheat sheet ready for how to use Groove Pizza if students don't have enough time to explore before the lesson.</p>



Corrinne Fischer, Northmont High School, Dayton, OH -- Teaching Muse Machine Summer Institute 2018-Inspired Lesson on Geometry – “What’s the Rhythm’s Shape?”



Student working on lesson



Classroom lesson aids

Welcome!
Let's Move

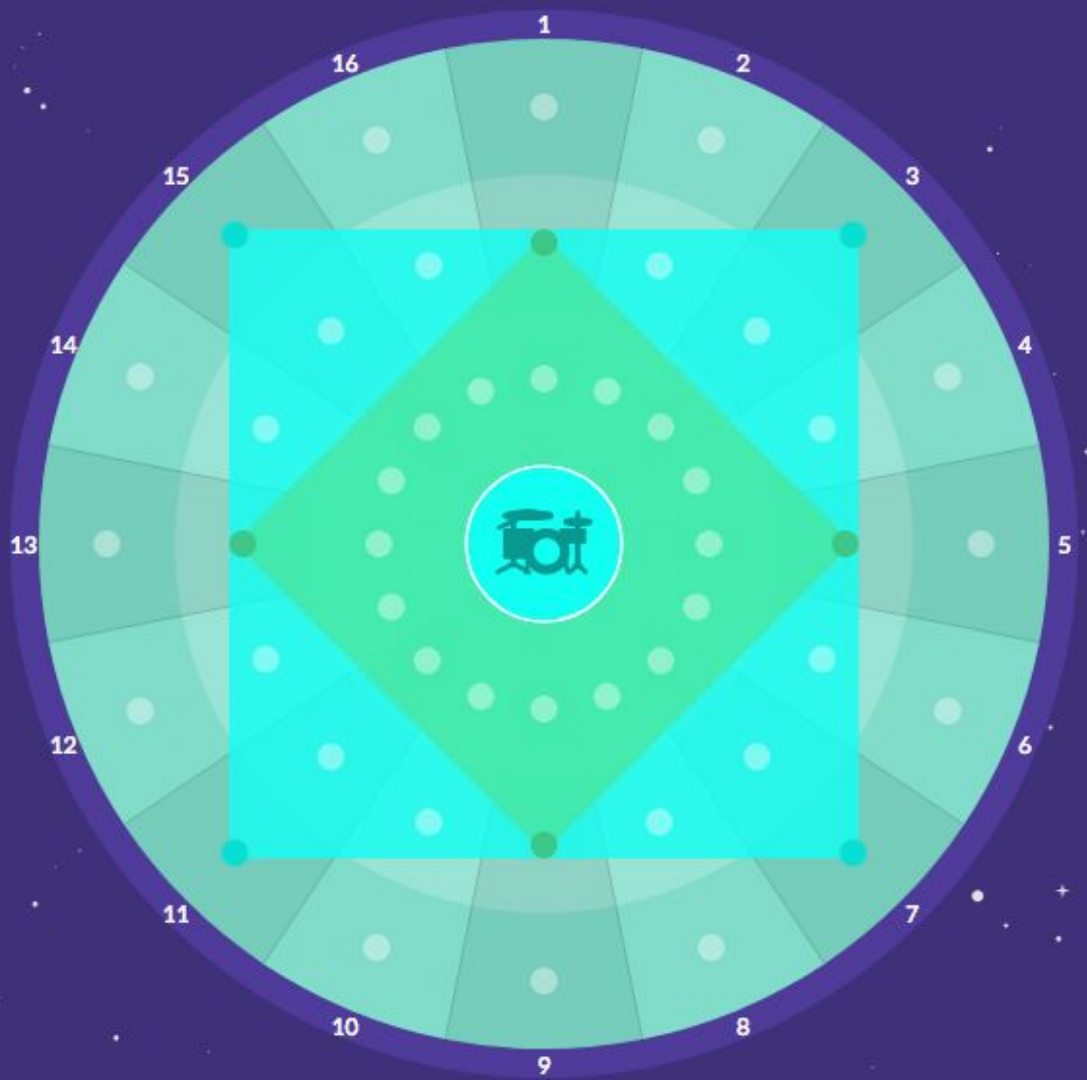
What's that rhythm's shape?

A Muse Lesson



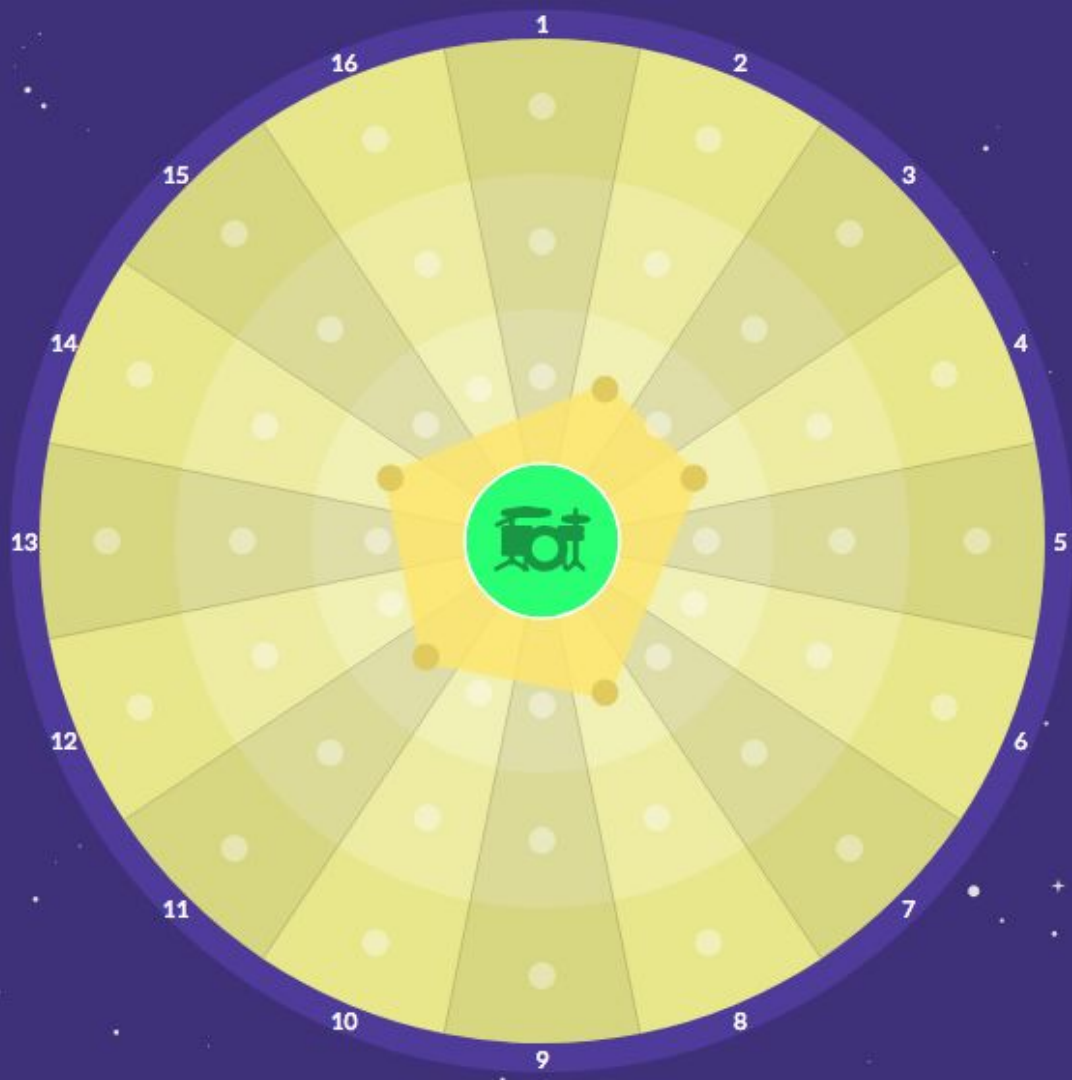
What do you see?

Write three observations below



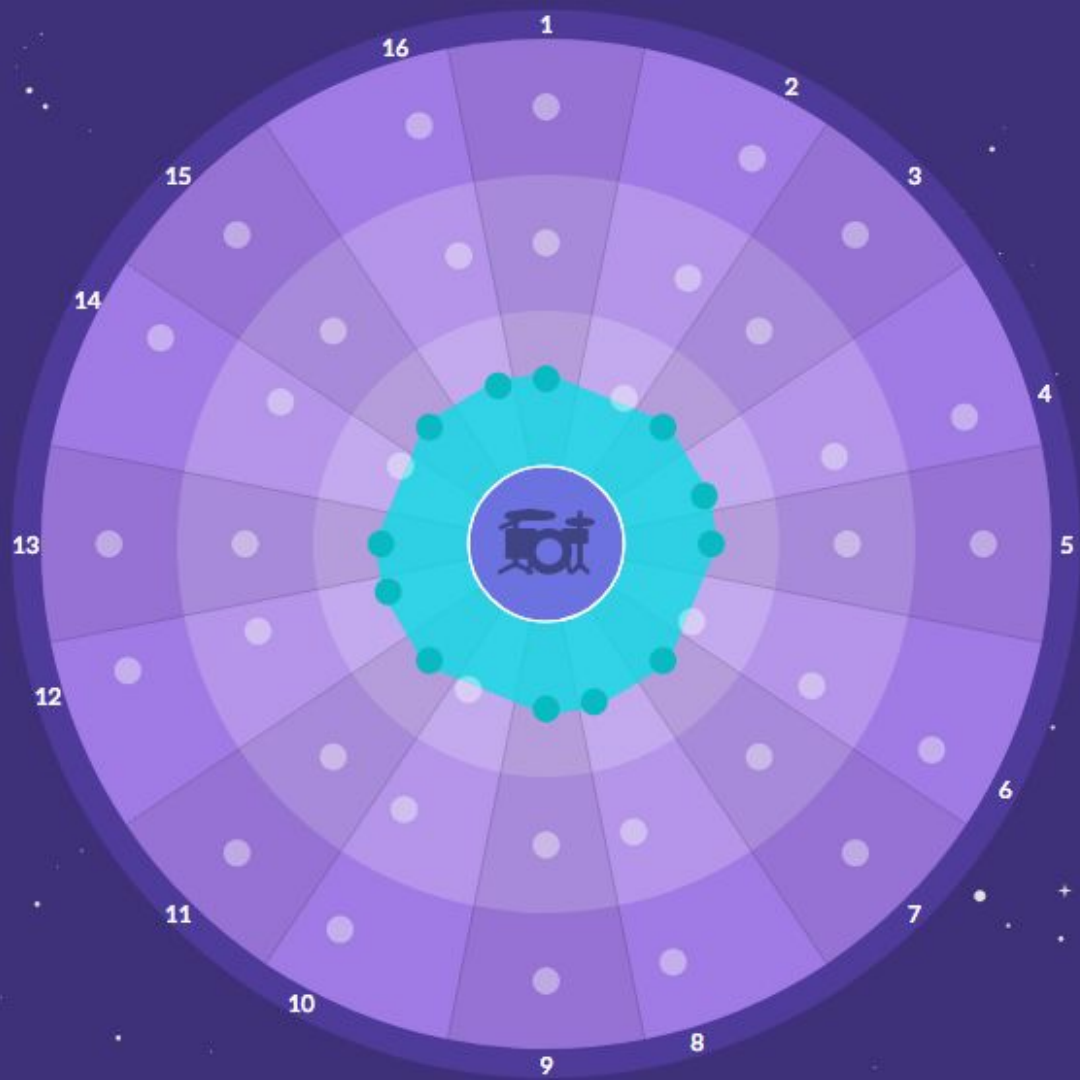
What do you see?

Write three observations below



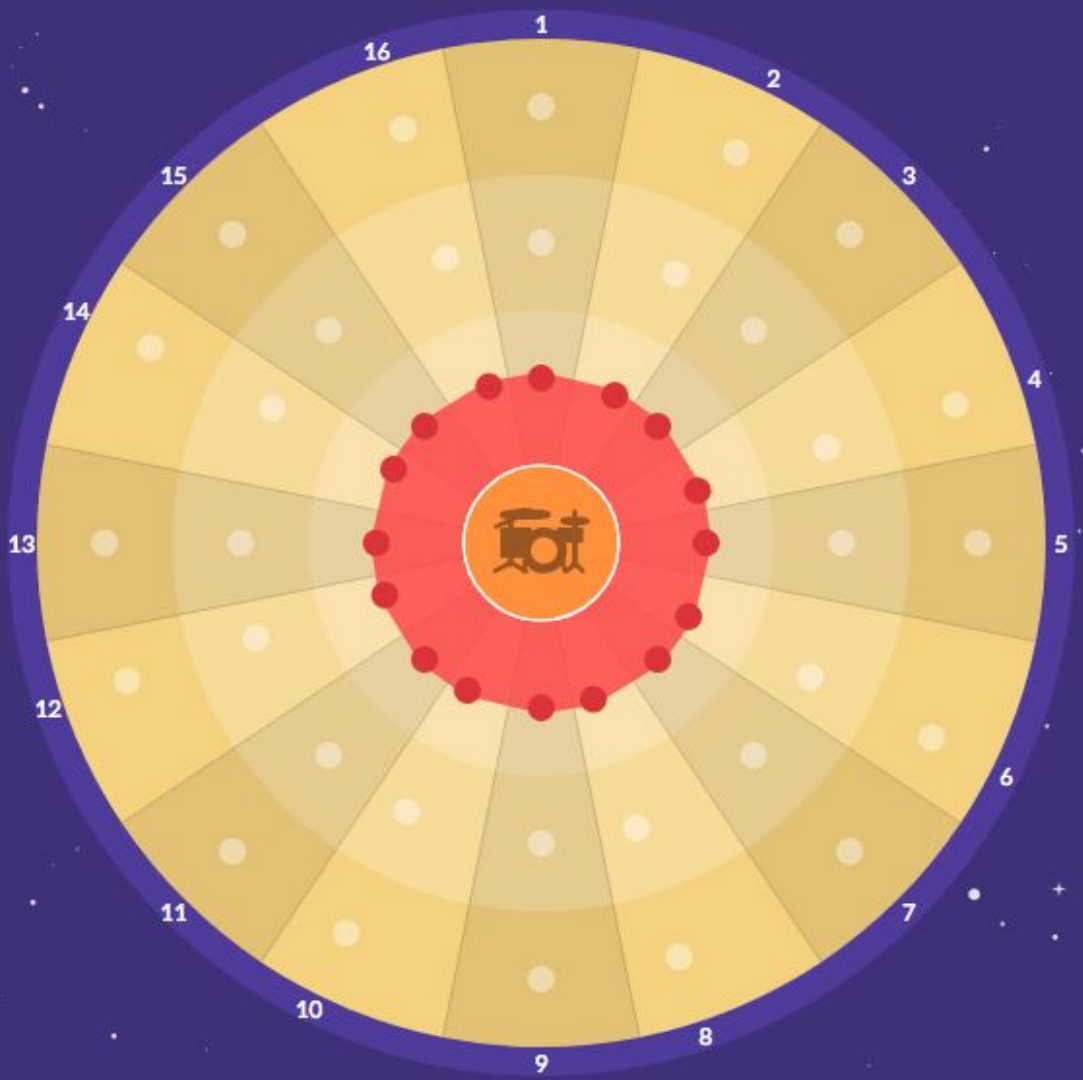
What do you see?

Write three observations below



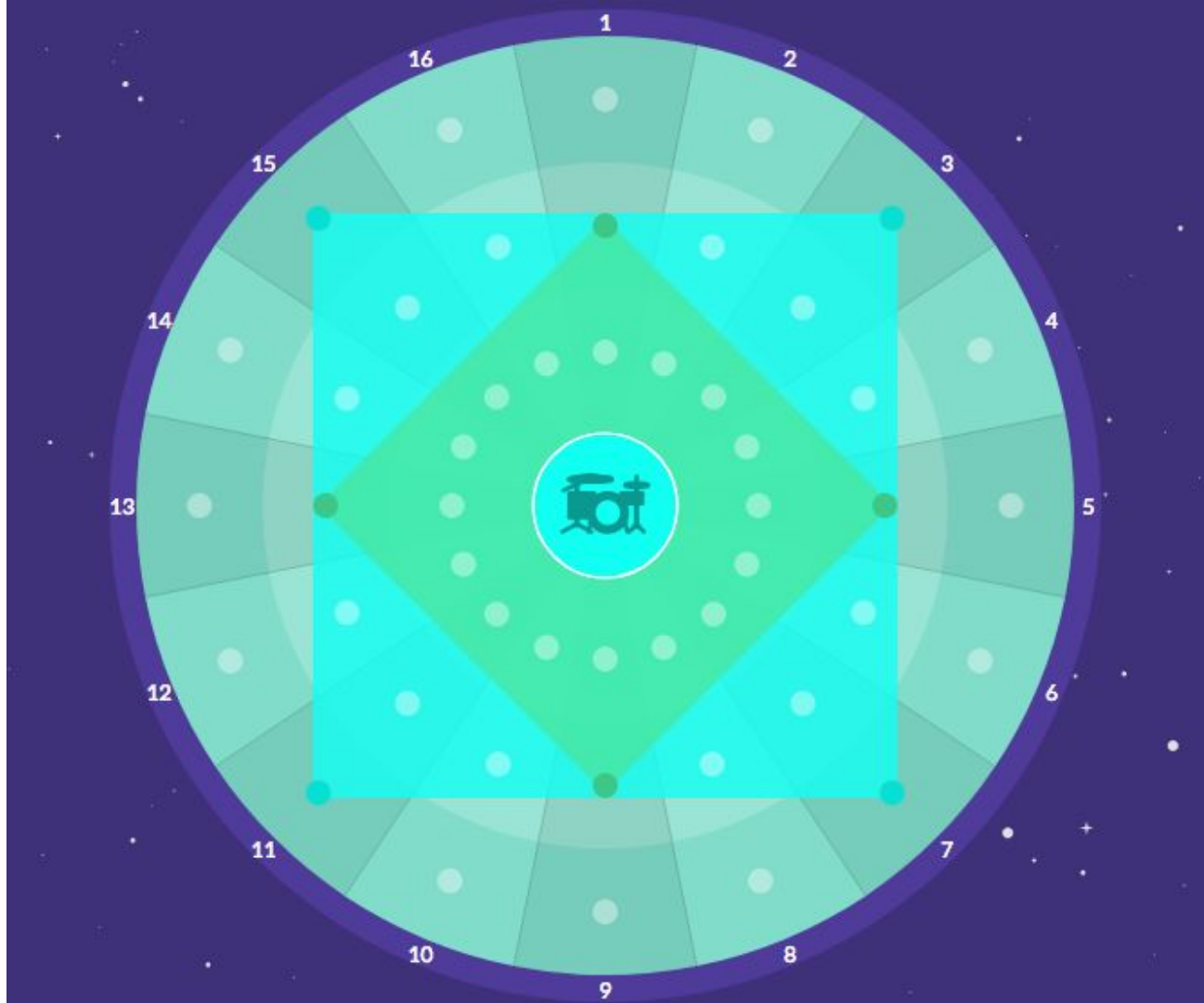
What do you see?

Write three observations below

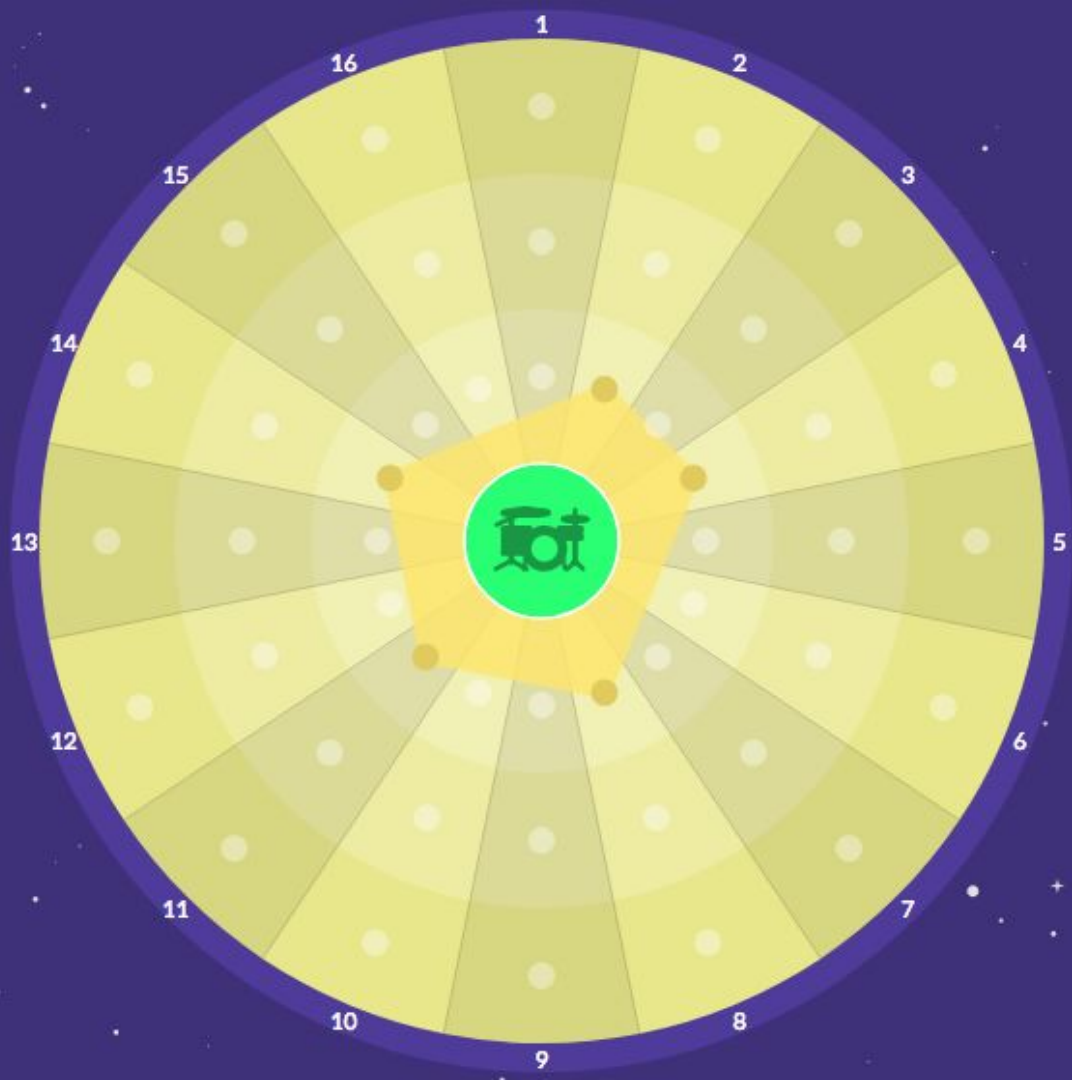


Groove Pizza

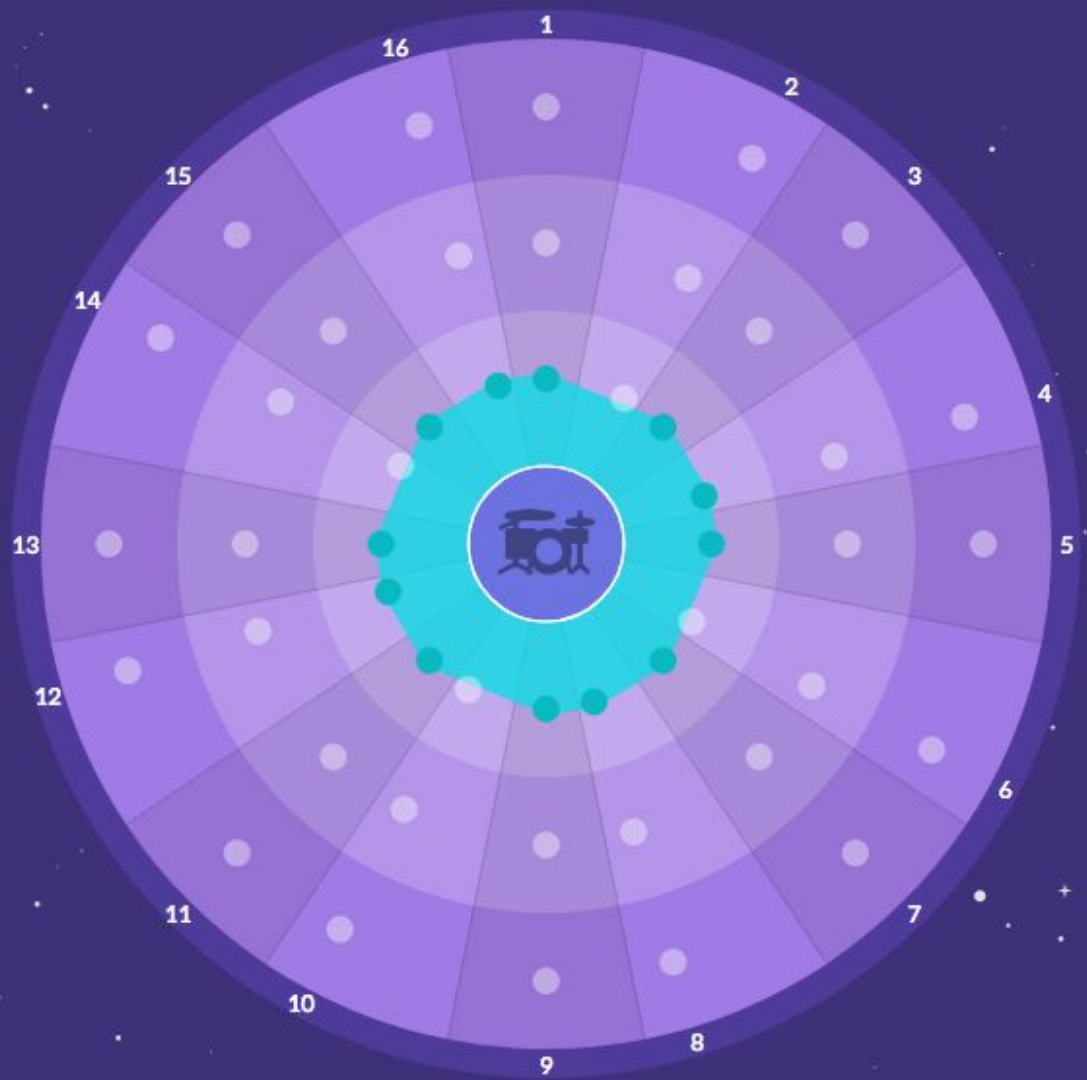
Stomp Clap Squares



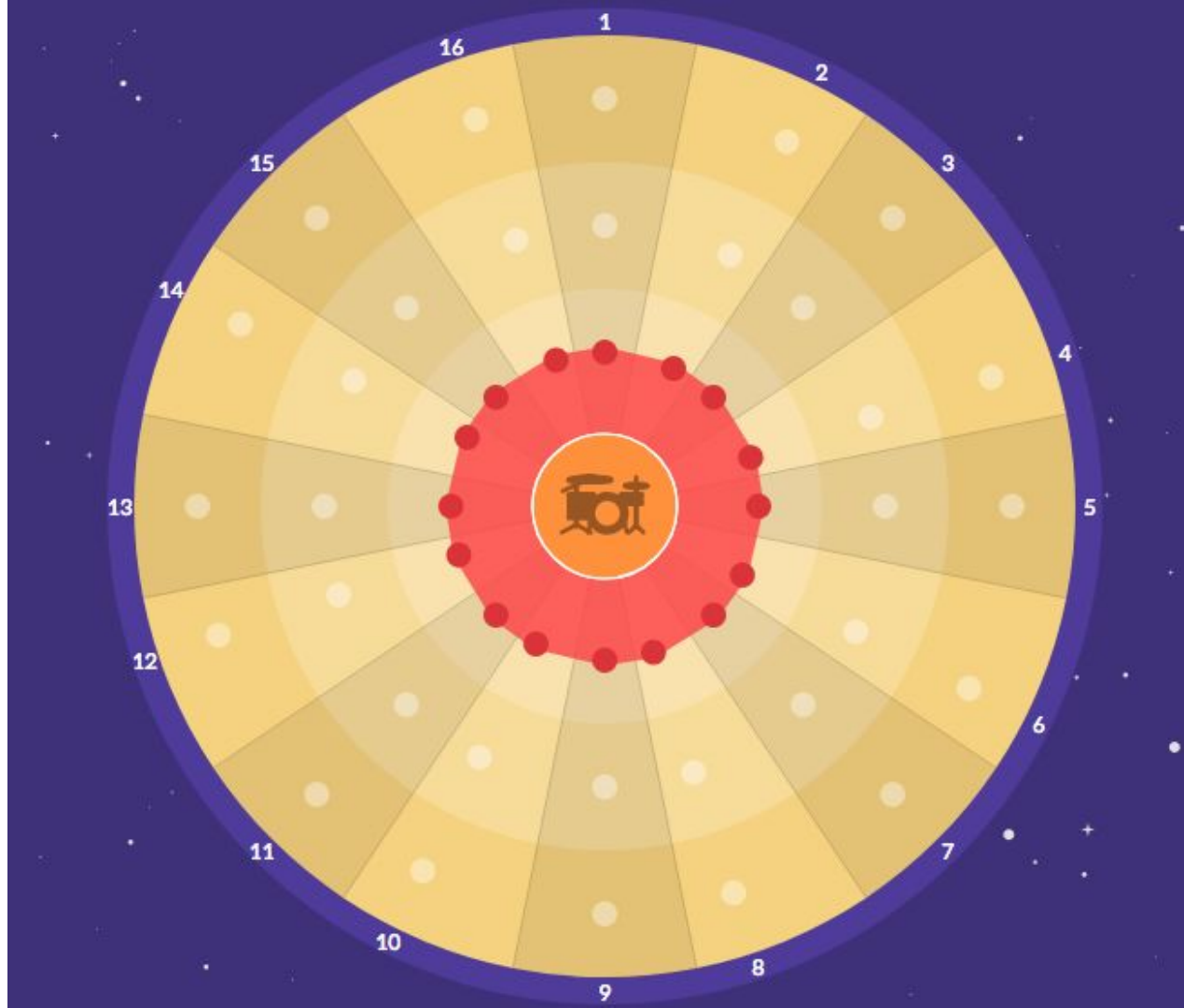
Clave Irregular Pentagon



Swing (12 sided) Dodecagon



Shuffle
16 sides
Hexadecagon

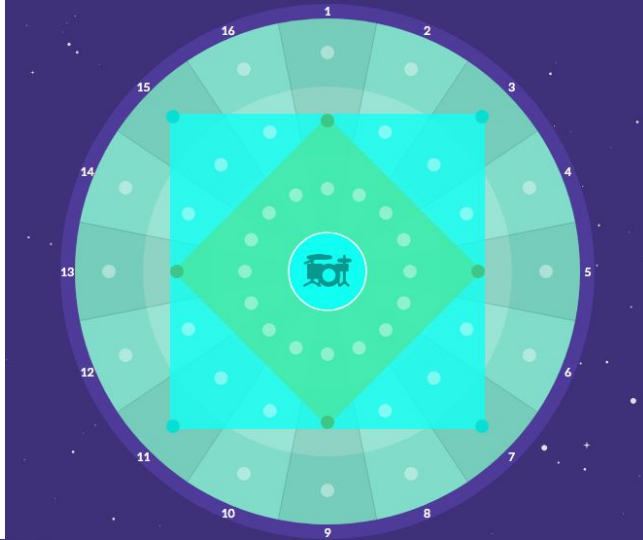


What can you do?

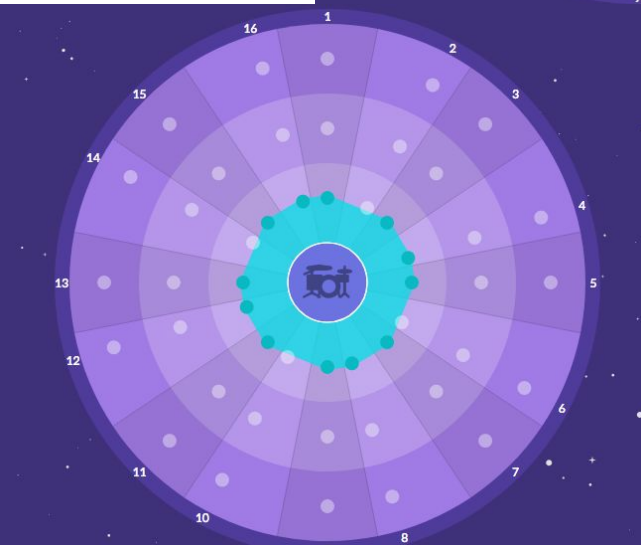
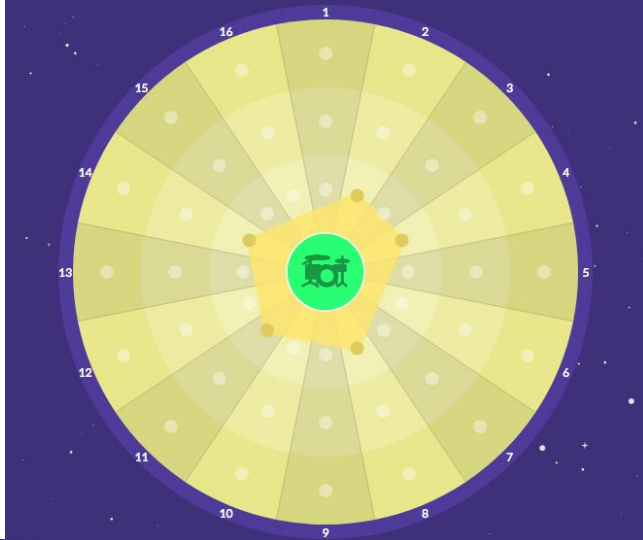
Make your own *Groove Pizza* presentation

- Create your own rhythms and include at least one of the four we've discussed.
- For each shape,
 - State the proper name
 - Find the SUM of its interior angles
 - State any transformations that are applied
- Presentation should include a screenshot, the info above, and link to your *Groove Pizza* _____

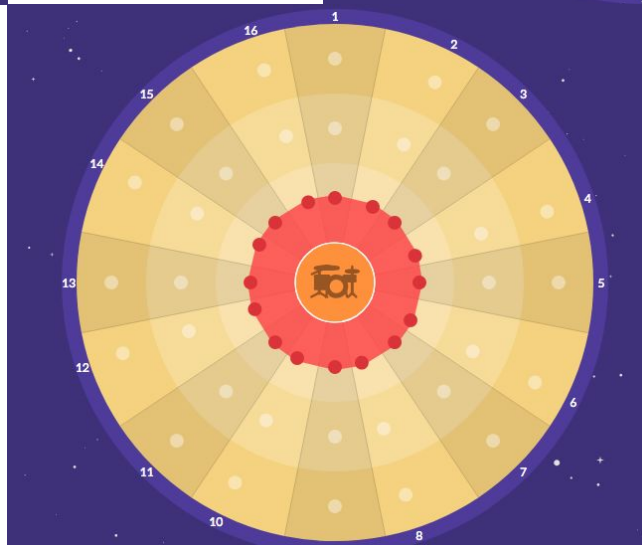
**Stomp
Clap**



Clave



Swing



Shuffle

Rubric For Presentations

	3	2	1	0
Basic Jazz Rhythm (Stomp-clap, clave, swing, shuffle)	The structure of one of the four basic jazz rhythms is clearly present.	The structure of one of the four basic jazz rhythms is mostly present.	The structure of one of the four basic jazz rhythms is somewhat present.	The structure of one of the four basic jazz rhythms is not present or this category is incomplete.
Shape Names	All polygons are named correctly.	At least two polygons are named correctly.	At least one polygon is named correctly.	No polygons are named correctly or this category is incomplete.
Interior Angles	The sum of the interior angles for all polygons is correct.	The sum of the interior angles of at least two polygons is correct.	The sum of the interior angles of at least one polygon is correct.	None of sums of the interior angles of the polygons are correct or this category is incomplete.

Rubric For Presentations Continued

	3	2	1	0
Transformations	Transformations of any congruent or similar polygons (ex. Two squares) are stated and correct.	Transformations of any congruent or similar polygons (ex. Two squares) are stated and at least 50% are correct.	Transformations of any congruent or similar polygons (ex. Two squares) are stated and at least 25% correct.	Transformations of any congruent or similar polygons (ex. Two squares) are stated and incorrect or this category is incomplete.
Presentation	Presentation is submitted on time and includes a screenshot and link to <i>Groove Pizza</i> .	Presentation is submitted on time and includes a screenshot or link to <i>Groove Pizza</i> .	Presentation is not submitted on time but includes a screenshot and/or link to <i>Groove Pizza</i> .	No presentation is submitted.