

## The Brain-Body Connection Teacher Training Workshop

### Math and Body Music by Linda Akiyama

**Activity 1: Polygons** - Warm up with *Name that Polygon* chant to review rhythm blocks and memorize the names of these polygons:

Triangle, Quadrilateral, Pentagon, Hexagon, Heptagon, Octagon, Nonagon (no-na-gon)

### Activity 2: Number of the Day-Addition Facts, Number Patterns, Addends and Sum

Number is 8

One of a pair of students does a rhythm block that represents a number under 8.

His/her partner does a rhythm block that when added to the first number = 8.

They take turns doing their rhythm block and counting the number of sounds.

Student 1

**clap** chest chest  
**1** 2 3

Student 2

**clap** chest chest thigh thigh  
**1** 2 3 4 5

Then they put their rhythm blocks together to create the number of the day and play it and count it together. Eventually they play it without counting.

**clap** chest chest **clap** chest chest thigh thigh  
**1** 2 3 **4** 5 6 7 8

### Activity 3: Commutative Property of Addition Game

$a + b = b + a$  Two numbers can be added in any order and the sum is the same.

Introduction: What if you played your rhythm blocks in a different order? That is, you played the 5 first and the 3 second. Would you still get 8 sounds? Let's try it. (Illustrate w/student to assist you)

**clap** chest chest thigh thigh **clap** chest chest  
**1** 2 3 4 5 **1** 2 3

**clap** chest chest **clap** chest chest thigh thigh  
**1** 2 3 **1** 2 3 4 5  
**1** 2 3 **4** 5 6 7 8

### Commutative Property of Addition Game

One of a pair plays an additive rhythm, then says "equals".  
The other student responds with a rhythm that demonstrates the commutative property.  
(Students only say numbers out loud if it helps them grasp the concept.)

#### Example:

student 1 plays:

**clap** chest **clap** chest chest

**1** 2 **1** 2 3

Then says: "EQUALS"

student 2 responds:

**clap** chest chest **clap** chest

**1** 2 3 **1** 2

CHALLENGE: "Instead of playing one rhythm and then the other, can you and your partner play your 2 rhythms at the same time? Start at the same time, keep the same tempo, and end at the same time. Once you do that, how many times can you play your rhythms together and still keep in sync?"

### **Activity 4: Body Music Orchestra plays – Commutative Property of Addition**

Number of the Day is 5.

½ of the room plays 2 + 3 rhythm

Group A

**clap** chest **clap** chest chest

**1** 2 **1** 2 3

While the other half of room plays 3+2 rhythm

Group B

**clap** chest chest **clap** chest

**1** 2 3 **1** 2

Conductor (teacher at first, later a student) conducts the orchestra, setting the tempo.

**We can use math to write down each part as a numerical expression**

**Group A plays part 4 times =  $4(2+3)$**

**Group B plays part 4 times =  $4(3+2)$**

**$4(2+3) = 4(3+2)$**

**$20 = 20$**

**Activity 5: Body Music Orchestra plays – Commutative Property of Multiplication**

Intro: Multiplication as repeated addition. Illustrate with 5 students standing in a row. From left to right each student does a selected rhythm block and counts how many sounds he/she made. Repeat having observing students count by adding on to end with the total number of sounds. Example 3s.

<b>clap</b>	chest	chest	<b>clap</b>	chest	chest	<b>clap</b>	chest	chest	<b>clap</b>	chest	chest	<b>clap</b>	chest	chest
<b>1</b>	2	3	<b>1</b>	2	3	<b>1</b>	2	3	<b>1</b>	2	3	<b>1</b>	2	3
1	2	3	<b>4</b>	5	6	<b>7</b>	8	9	<b>10</b>	11	12	<b>13</b>	14	15

$a \times b = b \times a$  Two numbers can be multiplied in any order and the product will be the same.  
 $4 \times 3 = 3 \times 4$

$\frac{1}{2}$  room plays 3s rhythm block for four times

<b>clap</b>	chest	chest	<b>clap</b>	chest	chest	<b>clap</b>	chest	chest	<b>clap</b>	chest	chest
<b>1</b>	2	3	<b>1</b>	2	3	<b>1</b>	2	3	<b>1</b>	2	3

While other  $\frac{1}{2}$  plays 4s rhythm block for three times

<b>clap</b>	chest	chest	thigh	<b>clap</b>	chest	chest	thigh	<b>clap</b>	chest	chest	thigh
<b>1</b>	2	3	4	<b>1</b>	2	3	4	<b>1</b>	2	3	4

Conductor (teacher at first, later a student) conducts the orchestra, setting the tempo  
Then play longer sequences for the joy of it!

**NOTE: This activity can also be used to illustrate Least Common Multiple**

**Activity 6: Permutations - How many ways can you arrange 3 rhythm blocks?**

Number of the day is 8

Choose three different numbers that add up to 8. (Example 1+3+4)

Put them in as many different arrangements as you can. How many arrangements did you find?

Play them with the rhythm blocks to create different rhythms.

Choose one of the rhythms to repeat 3 times. How many sounds did you make?

**Activity 7: Distributive Property of Multiplication over Addition** – number sentences as Rhythm Notation

1. Suppose that we wanted to remember a rhythm by writing it as a numerical expression. What ideas do you have for writing this rhythm?

Demonstrate:

(clap step clap step step)(clap step clap step step)(clap step clap step step)(clap step clap step step)  
1 2 1 2 3 1 2 1 2 3 1 2 1 2 3 1 2 1 2 3

Have students talk with partners. Have volunteers share ideas and tell why they think that.

Possibilities:

$$4 \times (2+3)$$

$$4 \times 5$$

$$(2+3) + (2+3) + (2+3) + (2+3)$$

2. How would you write this rhythm as a numerical expression?

(clap step)(clap step)(clap step)(clap step)(clap step step)(clap step step)(clap step step) (clap step step)  
1 2 1 2 1 2 1 2 1 2 3 1 2 3 1 2 3 1 2 3

Possibilities:

$$(4 \times 2) + (4 \times 3)$$

$$2+2+2+2+3+3+3+3$$

Play both rhythms alternately several times. What do these two rhythms have in common?

Lead into  $4(2+3) = 4 \times 2 + 4 \times 3$

$$4 \times 5 = 8 + 12$$

$$20 = 20$$

**Activity 8: Multiplication** – Finding multiples of a number *Number of the day is 3.*

To find multiples of a number, put the clap at the end of each rhythm block. Illustrate with 5 students standing in a row. From left to right each student does a selected rhythm block and counts how many sounds he/she made. Repeat having observing students count by adding on to end with the total number of sounds.

Example 3s

chest	chest	<b>clap</b>	chest	chest	<b>clap</b>	chest	chest	<b>clap</b>	chest	chest	<b>clap</b>	chest	chest	<b>clap</b>
1	2	<b>3</b>	1	2	<b>3</b>	1	2	<b>3</b>	1	2	<b>3</b>	1	2	<b>3</b>
1	2	<b>3</b>	4	5	<b>6</b>	7	8	<b>9</b>	10	11	<b>12</b>	13	14	<b>15</b>

**Middle School and High School Math and Rhythm Websites** - You can use Keith Terry's rhythm blocks with students to explore many of the ideas that are on these websites.

*Culturally-Relevant Algebra Teaching: The Case of African Drumming.* Janet Sharp and Anthony Stevens. [nasgem.rpi.edu/files/1456](http://nasgem.rpi.edu/files/1456)

*Polyrhythms: Multicultural Mathematics.* Rachel Hall  
<http://www.sju.edu/~rhall/Multi/polyrhythms.html>

*Asymmetric Rhythms and Tiling Canons.* Rachel Hall [www.sju.edu/~rhall/EPADEL/epadel.pp](http://www.sju.edu/~rhall/EPADEL/epadel.pp)