

**12-18 YEARS**

**TRACK 3  
MUSIC**

## Counting Subdivisions - 4 Beat Cycles #T3-1

### Track 3: Music Category: Rhythm

**Age:** 12-18 years

**Group/Individual:** Individual

**Materials:** 4 Beat Cycle Circle Template \* Metronome (if necessary) \* Syllable Chart  
Body Percussion Chart \* 4 Beat Cycle Subdivision Chart

#### Prerequisites:

- “Body Percussion - 5 Beat Cycle with Subdivisions” (Group)
- “Learning Steady Rhythms by Counting Rhythms - 8 Beat Cycles” (Individual)

#### Teacher Preparation:

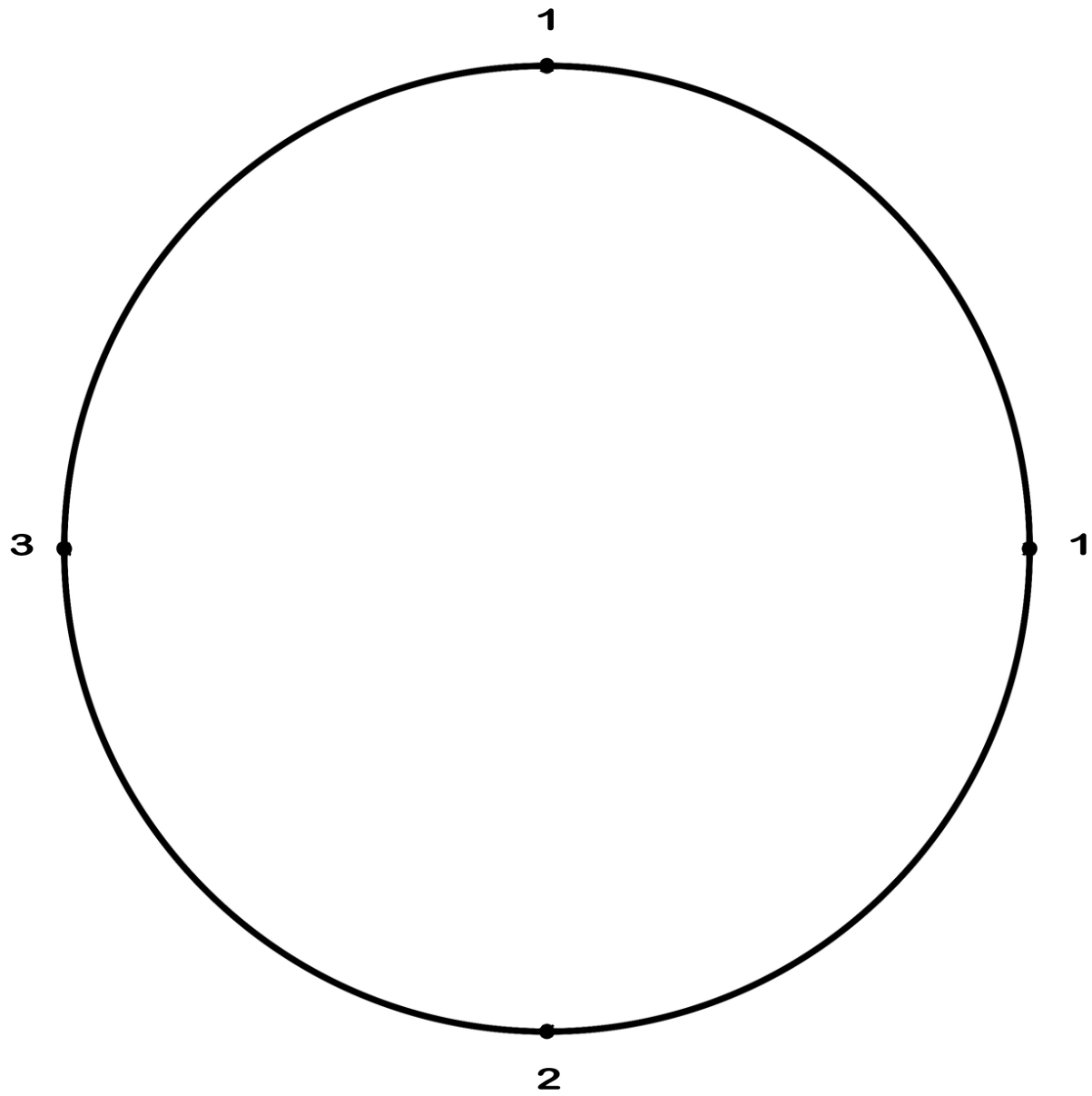
- Familiarize yourself with Circle Templates

**Repetition and Duration:** Repeat as many times as necessary to feel comfortable before moving on to next exercise

#### Presentation:

##### Counting Subdivisions with Numbers and Tapping

1. Find and print the “4 Beat Cycle Template”.
2. This exercise will first work with a (1, 3) subdivision of a 4 beat cycle, meaning the 4 beat cycle is broken into a 1 beat cycle and a 3 beat cycle.
3. Cut three small pieces of paper and write “1”, “2”, and “3” on them. Place the paper that says “1” over beat 2 on the template. Place paper that says “2” over beat 3 and the paper that says “3” over beat 4 on the template. It should look like this:



4. Say the numbers in a consistent rhythm 4 times:

1, 1, 2, 3  
1, 1, 2, 3  
1, 1, 2, 3  
1, 1, 2, 3

5. Note how it feels.

6. Repeat the numbers until comfortable with the subdivision and rhythm.

7. Begin tapping on each number as it is counted.

### **Counting Subdivisions with 2 Syllables**

#### 2 Syllables Only – First syllable on beat 1; Second syllable on all other beats

1. Continue tapping and say “Ho” for each beat 1, and say “Hey” for all the other beats:  
  
1 – Ho  
1 – Ho  
2 – Hey  
3 – Hey
2. Now choose a different subdivision from the “4 Beat Cycle Subdivision Chart.” As before, write the numbers for the subdivision on a piece of paper and place the subdivision numbers on the Circle Template.
3. Tap and say “Ho” for each beat 1 and “Hey” for all the other beats. Repeat with all the different subdivisions from the chart.
4. Note which subdivisions are favorites and write them down.

### **Body Percussion - One Body Part**

Note: Go slow and stop the body percussion and return to just counting as many times as needed.

1. Still counting, hit your chest with an open hand softly (Chest Slap) on each beat 1.
2. Now try clapping softly on each beat 1. Then try a finger Snap on each beat 1. Finally try hitting the upper leg (Leg Slap) on each beat 1.
3. Try these with different subdivisions (see “4 Beat Cycle Subdivision Chart”).

### **Body Percussion - Two Body Parts**

1. Once comfortable with the body percussion on each beat 1, try a Chest Slap on each beat 1 and a finger snap on all other beats:  
  
1 – Chest Slap – Ho  
1 – Chest Slap – Ho  
2 – Finger Snap – Hey  
3 – Finger Snap – Hey
2. Now try a Leg Slap on all the other beats instead of a snap. Try this with the different subdivisions (see “4 Beat Cycle Subdivision Chart”).

### **Counting Subdivisions with 3 Syllables**

### Number of Syllables Equals Number of Beats

1. Now use 3 syllables, “Ho, Hey, Hum”. Always use the same syllable for the same beat:

1 – Ho  
1 – Ho  
2 – Hey  
3 – Hum

2. Try these syllables with different subdivisions (see “4 Beat Cycle Subdivision Chart”).

### **Body Percussion - Three Body Parts**

1. Continuing with the same syllables, add body percussion with three body parts, making sure each body percussion correlates to the same beat (for example, all beat 1’s will be a chest slap):

1 – Chest Slap – Ho  
1 – Chest Slap – Ho  
2 – Finger Snap – Hey  
3 – Clap – Hum

2. Now choose three different body percussion (see “Body Percussion Chart”) and repeat. If having difficulty remembering, draw them on a piece of paper and place them on the circle template.
3. Try this with the different subdivisions (see “4 Beat Cycle Subdivision Chart”).

### **Dropping Beats**

1. Now stop the body percussion and return to tapping and syllables. Drop out beat 2 (no tap or syllable):

1 – Ho  
1 – Ho  
2 – Silence  
3 – Hum  
Repeat.

2. Alternate bringing beat 2 in and out, i.e. one round do beat 2, and the next round, don’t do beat 2.
3. Drop out other beats 1 at time, 2 at time, and all 3. Try different combinations for each number of beat drops. Bring them in and out. Notice when you drop out a beat that creates an interesting rhythm that you especially like.

### **Syllable Variations**

1. Try using the following 3 syllables:

Syllable 1 – Ta

Syllable 2 – Na

Syllable 3 – Ki

Make sure the same syllable correlates to the same beat, for example with the (1, 3) subdivision it would be:

1 – Ta

1 – Ta

2 – Na

3 – Ki

Syllable 1 – Da

Syllable 2 – Na

Syllable 3 – Mi

Syllable 1 – Ka

Syllable 2 – Cha

Syllable 3 – Po

2. Choose 3 new syllables (see “Syllable Chart”) and repeat the exercises.
3. Try dropping beats with the new syllables.

### **Alternating Subdivisions**

1. Choose two subdivisions (see “4 Beat Cycle Subdivision Chart”) and repeat the exercises while switching back and forth between the subdivisions for each round.
2. Try this with different subdivisions.

### **Alternating Dropped Beats**

1. Repeat the exercises above and choose different beat or beats to drop out.
2. Drop out a different beat on each round. Try 2 different drops – drop a certain beat on round one and a different one (or more) on round two.
3. Drop a different beat(s) every round.
4. Try this with different syllables, body percussion and subdivisions.

### Alternating Tempos

1. Choose a subdivision and count it at a tempo that is comfortable. On the second round slow the tempo to half the speed. Go back and forth between the two tempos, alternating each round.
2. Now try having the second tempo be twice as fast.
3. Now choose any tempo for the second tempo.
4. Try this with different syllables, body percussion, and subdivisions.

### Control of Error:

#### Language:

POINTS OF INTEREST	DEVELOPMENTAL VALUE
If the student is having a difficult time perhaps the tempo is either too fast or too slow. Urge them to try a better tempo. If they still are having trouble help them set it at a comfortable tempo for them. The tempo will be different for different students depending on their natural rhythm and their capability.	The more involved the student, the more they receive the benefits of the rhythm entrainment.
Watch everyone's performance closely to determine how long to do the exercise and when to move on to the next step in the exercise. Ideally, you want each student to get the sounds and movement down. If a child is getting frustrated have them go back to a previous exercise. They may also do better on another day. Once a student has the exercise step down, have them continue for a bit so they get entrained into the rhythm, get it in their body, feel confident and are not getting bored. Then have them move on to the next step.	It is not good when a student feels like they can't do an exercise. It is also not good when a child is bored and loses interest.
	Left and Right movement synchronizes the left and right brains – the ideal state for development.
When dropping beats at first the student may have to point his or her hand in the air to help	

keep track of the beat.	
The student needs to work in a location that is relatively quiet so they can focus on the sound of their own voice.	
The student is welcome to close their eyes to help focus attention, once they no longer need the visual cue of the template page	
The student should be encouraged to notice their state upon completion of speaking a cycle or series of cycles.	
The student should speak calmly and with a soft and resonant voice.	
The children should self-regulate by pausing and resting as needed.	
It is often around the 20-minute mark of rhythmic immersion that there is a change in brain wave function – whenever possible, encourage the students to work with this exercise for 20 minutes or longer.	
If certain students are not able to maintain a consistent speaking, tapping or body percussion tempo, provide them with a metronome for assistance.	
Subdivisions are complex so be aware if they might be too difficult for the particular age group – some students may be able to grasp it sooner than others.	
Note when a student loses track of where the first syllable of the cycle occurs. Instruct the student to speak more slowly and track the syllables on the template page as they are speaking in order to keep track of beat 1. If a student is still struggling, instruct them to softly clap or pat their leg every time they speak the first syllable of the cycle.	

PURPOSE	RESEARCH AND ASSUMPTIONS
Overall Connection	Awareness in the moment of frequency, timbre, rhythm, melody, music, light, the



➤ <b>Presence</b>	body, feelings, emotions and thoughts make a person healthier and ready to deal with any challenges and conflicts.
Overall Connection  ➤ <b>Consistency</b>	<p>Consistent rhythms entrain the child into peace, creating physical and emotional stability through the development of steady brainwaves, thought patterns, and focus. This stability strengthens immunity and overall health, while also generating a sense of bonding. In addition, the development of in sync timing is foundational for cognitive thought, movement, sensory response, and vital functions.</p> <p>Repetitive speak catalyzes a parasympathetic response of the nervous system and increased vagal tone by stimulating the vagus nerve.</p>
Overall Connection  ➤ <b>Musicality</b>	Pitch perception and the use of rhythm enhance musicality. Developing musical abilities aids in left and right brain synchronization, speech and language skills, creative expression, emotional awareness, and improving mental functions such as memory, focus, problem solving. Additionally, toning develops the ear-voice connection, which supports the natural development of musical expression.
Overall Connection  ➤ <b>Self-Expression</b>	<p>Self-expression is critical for a healthy, creative, and confident human being.</p> <ul style="list-style-type: none"> <li>• The National Association for Music Education states that that music can be used “as a tool for expressing and releasing difficult and beautiful emotions.”</li> </ul>
Overall Connection  ➤ <b>Smooth Flow</b>	A smooth flow of sounds and music entrain all systems in a human being into a consistent flow, which is the basis of peace and

	harmony. Physical, mental, and emotional flow with minimal blockages is the essence of health.
Overall Connection ➤ <b>Career</b>	The National Association for Music Education states that study of music “may lead to a career – not necessarily connected to the arts” and “helps with flow and interaction in many different areas.”
Physical Connection ➤ <b>Body Awareness</b>	Movement aids in the development of body awareness, improving gross and fine motor skills, spatial awareness, right brain functioning, balance, and muscle tone.
Physical Connection ➤ <b>Vestibular Stimulation</b>	Working with rhythm stimulates the vestibular system, which plays an important role in maintaining stable blood pressure while moving, balance, motor coordination, spatial memory, and spatial navigation.
Physical Connection ➤ <b>Motor Coordination</b>	Combining rhythm and movement stimulates the vestibular system, which plays an important role in motor coordination. Motor Coordination helps with socio-cognitive skills and cognition. <ul style="list-style-type: none"> <li>• The National Association for Music Education says “playing instruments or moving to music helps develop motor skills.”</li> </ul>
Physical Connection ➤ <b>Auditory – Motor Coordination</b>	Matching sound and movement increase auditory-motor coordination, which helps with preverbal communication, socio-cognitive skills, and cognition. It also builds strong and robust neural networks between voice and movement.
Emotional Connection ➤ <b>Emotional Stability</b>	Consistent rhythms and tones entrain the brain into a coherent state that supports emotional stability. When consistent tones or

	<p>harmonious melodic intervals are listened to or produced by the voice they create emotional and physical harmony. Emotional stability contributes to overall well-being, self-confidence, sense of security, emotional intelligence, and positive social behavior.</p>
<p>Emotional Connection</p> <p>➤ <b>Empathy</b></p>	<p>Nonverbal communication develops emotional intelligence and empathy, as the children learn to perceive and express emotions. Engaging with music, sound, and rhythm in a group setting gives children a healthy outlet for their expression and an opportunity to observe their classmate's emotional expression, cultivating a greater sense of empathy. Empathy plays a key role in developing social connection, pro-social behavior, and conflict resolution skills.</p> <ul style="list-style-type: none"> <li>• The National Association for Music Education states that the study of music develops an “understanding of different emotions.”</li> </ul>
<p>Emotional Connection</p> <p>➤ <b>Healthy Emotional Expression</b></p>	<p>Healthy emotional expression and interaction with the world develops healthy intellectual functioning contributing to a healthier, more productive, and creative individual. Using nonverbal and gestural communication promotes growth in a child's brain, enhancing their ability to experience and understand their environment.</p> <ul style="list-style-type: none"> <li>• The National Association for Music Education states that that music can be used “as a tool for expressing and releasing difficult and beautiful emotions.”</li> </ul>
<p>Mental/ Emotional Connection</p> <p>➤ <b>Creativity</b></p>	<p>Creative expression develops imagination, problem solving skills, emotional intelligence, and conflict resolution skills. Fostering creativity provides children with a lifelong</p>

	<p>tool that relieves stress, provides a healthy outlet for expression, strengthens a sense of self, and establishes a unity between the brain hemispheres. Creative expression in the voice promotes the use of a full range of possible sounds, resulting in new neural pathways that aid in future learning.</p> <ul style="list-style-type: none"> <li>• The National Association for Music Education lists “creative expression” as one of the key benefits of studying music.</li> </ul>
<p>Mental Connection</p> <p>➤ <b>Brainwave Entrainment</b></p>	<p>Consistent tones and rhythms create brainwave entrainment, a process whereby the brain synchronizes to the frequency of the external stimuli. This allows the brain to entrain into certain brainwave states, such as delta, theta, alpha, and beta. These brainwave states have been proven to enhance sleep, meditation, creativity, presence, focus, learning and mental processing.</p>
<p>Mental Connection</p> <p>➤ <b>Focus and Concentration</b></p>	<p>Sufficient focus and concentration on something will fire neurons in new patterns, creating neural pathways that support cognition. Call and Response exercises activate the reticular activating system (RAS), which controls the ability to become mentally focused and alert, a necessary foundation for optimal learning.</p> <ul style="list-style-type: none"> <li>• The National Association for Music Education lists “memory and focus of the mind” as one of the key benefits of music.</li> </ul>
<p>Mental Connection</p> <p>➤ <b>Memory</b></p>	<p>Call and response exercises develop memory, which plays a critical role in learning. Ear to voice imitation activates the firing and wiring of the mirror neurons responsible for creating the neural pathways that are the beginning of new memories, supporting effortless learning.</p>

<p>Mental Connection</p> <p>➤ <b>Whole Brain Synchronization</b></p>	<p>Music, rhythm, and geometry engage both sides of your brain and help them work together, creating whole brain synchronization. This stimulates the corpus callosum, strengthening the bridge between the two brain hemispheres. Whole brain functioning improves cognition, focus, memory, creative thinking, problem solving, overall mental health, and the ability to perceive connections between seemingly contradictory concepts.</p>
<p>Mental Connection</p> <p>➤ <b>Creative Thinking</b></p>	<p>Creative thinking stimulates both hemispheres of the brain, improving cognition, memory, focus, and problem solving skills. This increases overall brain functioning and develops important neuronal pathways in the brain.</p>
<p>Spiritual Connection</p> <p>➤ <b>Spiritual Awareness</b></p>	<p>Music, sound, and rhythm provide an avenue to experience different states of consciousness that students may have not experienced before. These different states of consciousness can provide a perspective on their life that may help resolve issues.</p> <ul style="list-style-type: none"> <li>• The National Association for Music Education lists that one of the key benefits of studying music is “understanding energy and spirituality (health, relationships and even wealth).”</li> </ul>

**Future Learning:** Learning stable rhythms. Language learning. Musicality. Creative music composition.

**12-18 YEARS**

**TRACK 4**  
**SACRED GEOMETRY**

## Natural Patterns Scavenger Hunt #T4-13

### Track 4: Geometry Category: Patterns of Nature

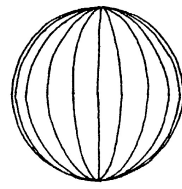
**Age:** 12-18 years

**Group/Individual:** Group / Individual

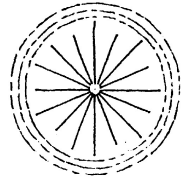
**Materials:** “Master Chart of Nature’s Patterns” \* “Patterns of Life Booklet” \* 10 Boxes with symbols for each pattern on them

#### List of Patterns for labeling

1. Sphere – Some Stones, Bubble
2. Radial – Spokes, Ripples – Splash, Explosion – Splash (not collectible),
3. Meander – Creek
4. Branching – Tree
5. Cluster/Close Packing – Bee Hive
6. Spiral – Snail shell
7. Helix – Slinky Toy
8. Alternation - Braiding, Hair Braid; Stepping right, left, right, left; Grapevine (plant or dance step)



**SPHERE**



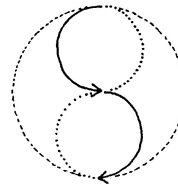
**EXPLOSION-RADIAL  
RIPPLE**



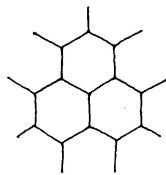
**MEANDER**



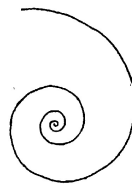
**BRANCHING**



**ALTERNATION**



**CLOSE-PACKING**



**SPIRAL**



**HELIX**

**Prerequisites:** n/a

### **Teacher Preparation:**

- Familiarize yourself with the patterns
- Perhaps look online for these different patterns and see if you can find different examples of things in nature (online) that match the patterns. Just a little preparation is good.
- Make the boxes up or mark off a section of table for each pattern with colored masking tape and label with name of pattern.

**Repetition and Duration:** Once per year

### **Presentation:**

#### **Natural Patterns Scavenger Hunt**

1. Introduce the patterns, showing three examples of each one. Show Richard Feather Anderson's "Master Chart of Nature's Patterns."
2. Go on a field trip somewhere in nature and have the children collect things from nature that fit the different patterns.
3. Make a box or a spot on a table for each pattern, using a symbol to label each one.



4. Have the children separate all the items they have collected personally into the appropriate box or spot on the table.

Note: Let them discover that some items could go into two different boxes. If the children don't realize it on their own, point out the items that could go into multiple boxes (for example, sunflower heads contain spiral, radial, and close-packing patterns)

### Control of Error:

**Language:** Natural Patterns \* Spiral \* Radial

POINTS OF INTEREST	DEVELOPMENTAL VALUE
Tracing the patterns with your finger helps the children to see them. Have them also trace with their fingers.	

PURPOSE	RESEARCH AND ASSUMPTIONS
Overall Connection  <b>Observation Skills</b>	The primary purpose of the study of geometry is to expand observation skills -- To be able to recognize patterns in seemingly chaotic things. To understand the underlying structure for creative work. To be able to find coherence and harmony in order to feel more in the body and emotions. And spiritually, to be able to connect to nature and the Universe more. "You can learn everything you need to know by observing nature" - Pythagoras
Overall Connection  ➤ <b>Presence</b>	Working with geometry and mandalas increases personal awareness and meditative states. Mandalas are specific shapes used by various traditions to represent the universe, thereby creating a sense of connection with a greater whole.
Overall Connection	Engaging with geometry uses both sides of the brain and helps them to work together,

➤ <b>Coherence</b>	resulting in greater coherence. Experiencing the microcosmic expressions of the Universe heals the split between the cosmos and ourselves, creating a sense of unity and wholeness.
Overall Connection ➤ <b>Musicality</b>	Seeing harmony visually enhances harmony in music creation.
Overall Connection ➤ <b>Connection to the Natural World</b>	<p>Working with shapes and geometric patterns promotes a greater appreciation of nature and the universe, as the student begins to see how these universal building blocks repeat in many places throughout nature and man-made structures. Connection with the natural world creates a greater sense of harmony and interconnectedness, allowing the student to develop a greater perspective of the whole. Experiencing reality from this expanded perspective synchronizes the brain hemispheres, which enhances creativity, problem solving, social intelligence, and emotional stability.</p> <p>Working with the natural patterns found in nature (such as the harmonic structure of sound and the golden mean) naturally resonate these patterns of perfection into the individual – physically, mentally, emotionally and spiritually.</p>
Overall Connection ➤ <b>Career</b>	Many different scientific and technological fields require knowledge of geometry. Especially in the more advanced and specialized study fields the use and knowledge of geometry is essential to excelling.
Mental/ Emotional Connection ➤ <b>Creativity</b>	Working with shapes and geometric patterns creates new neuronal pathways in the brain that enhance creativity. Once established, these pathways will manifest in creative thinking in other fields of work and play.

Mental Connection ➤ <b>Focus and Concentration</b>	Sufficient focus and concentration on something will fire neurons in new patterns, creating neural pathways that support cognition.
Mental Connection ➤ <b>Whole Brain Synchronization</b>	Music, rhythm, and geometry engage both sides of your brain and help them work together, creating whole brain synchronization. This stimulates the corpus callosum, strengthening the bridge between the two brain hemispheres. Whole brain functioning improves cognition, focus, memory, creative thinking, problem solving, overall mental health, and the ability to perceive connections between seemingly contradictory concepts.
Mental Connection ➤ <b>Analytical Skills</b>	Geometry assists in developing important analytical skills. Knowing how to apply and understand the relationship between shapes and sizes makes one better prepared to analyze when and how to use them in one's everyday lives. Analytical skills improve learning, decision making, and problem solving.
Spiritual Connection ➤ <b>Spiritual Awareness</b>	Working with geometry and mandalas increases personal awareness and meditative states. Mandalas are specific shapes used by various traditions to represent the universe, thereby creating a sense of connection with a greater whole.
Sensory Refinement ➤ <b>Spatial Awareness</b>	<p>Visually locating the source of a sound aids in developing spatial awareness, an essential cognitive skill that plays an important role in overall perception. Spatial awareness also plays a key role in auditory perception.</p> <p>Working with shape, dimension, and geometric pattern improves spatial understanding and awareness. This increases the brains ability to perceive and appreciate</p>

	<p>the role of shape and dimension in any given surrounding, allowing for an advanced understanding of space.</p> <p>Experiencing the microcosmic expressions of the Universe through geometry heals the split between the cosmos and ourselves, creating a sense of unity and wholeness.</p>
<p>Sensory Refinement</p> <p>➤ <b>Novelty</b></p>	<p>The auditory system adapts in response to novel stimuli, allowing for neural plasticity, a key feature of development throughout the nervous system.</p>

### Future Learning:

## Counting Spirals #T4-14

### Track 4: Geometry Category: Golden Mean and Fibonacci

**Age:** 12-18 years

**Group/Individual:** Group/Individual

**Materials:** Golden Mean and Fibonacci Drawings \* Plant Examples

**Prerequisites:**

- “Number Patterns in Nature”

**Guide Preparation:**

- Practice counting the spirals.

**Repetition and Duration:** Once per year

**Presentation:**

#### Count the Fibonacci Sequence

1. Explain the Fibonacci Sequence and its pattern: a series of numbers in which each number is the sum of the two preceding numbers. The series begins 1, 1, 2, 3, 5, 8, etc.
2. Have them count it on paper to 30 numbers.

#### Counting Spirals in Drawings

1. Find the drawings of spirals.
2. Demonstrate how to count spirals. Note that there are always two sets of spirals, one set of spirals will be tightly wrapped and the other one will spread out to the edge more.
3. Have the children mark the first spiral with a pen or pencil, starting from the center and following to the end.
4. Have them count how many spirals are in the first set, by starting in the center of the first spiral, going to the end, and moving to the second spiral and following it back to the center. Go in and out of adjacent spirals until they get back to the first spiral of the set. Have them write down the number.
5. Have them count the second set of spirals in the same way as the first and write down the number.

Note: Both numbers should be one of the Fibonacci numbers.

## Counting Spirals in Plants

### List of Plants

- i. Pine Cones
- ii. Succulents
- iii. Daisies
- iv. Cactus
- v. Sunflowers
- vi. Black Eyed Susan Flower

1. Using the plant, follow the same procedure as above to count the sets of spirals. Mark the first spiral with a colored pen or whiteout.

### Control of Error:

**Language:** Fibonacci Sequence

POINTS OF INTEREST	DEVELOPMENTAL VALUE
Count the number of spirals out loud to help keep track of the numbers.	
Watch for that “AHA” moment when they realize that all spirals in plants are always Fibonacci numbers.	

PURPOSE	RESEARCH AND ASSUMPTIONS
Overall Connection  <b>Observation Skills</b>	The primary purpose of the study of geometry is to expand observation skills -- To be able to recognize patterns in seemingly chaotic things. To understand the underlying structure for creative work. To be able to find coherence and harmony in order to feel more in the body and emotions. And spiritually, to be able to connect to nature and the Universe more. “You can learn everything you need to know by observing nature” - Pythagoras
Overall Connection	Working with geometry and mandalas increases personal awareness and meditative

➤ <b>Presence</b>	states. Mandalas are specific shapes used by various traditions to represent the universe, thereby creating a sense of connection with a greater whole.
Overall Connection  ➤ <b>Coherence</b>	Engaging with geometry uses both sides of the brain and helps them to work together, resulting in greater coherence. Experiencing the microcosmic expressions of the Universe heals the split between the cosmos and ourselves, creating a sense of unity and wholeness.
Overall Connection  ➤ <b>Musicality</b>	Seeing harmony visually enhances harmony in music creation.
Overall Connection  ➤ <b>Connection to the Natural World</b>	<p>Working with shapes and geometric patterns promotes a greater appreciation of nature and the universe, as the student begins to see how these universal building blocks repeat in many places throughout nature and man-made structures. Connection with the natural world creates a greater sense of harmony and interconnectedness, allowing the student to develop a greater perspective of the whole. Experiencing reality from this expanded perspective synchronizes the brain hemispheres, which enhances creativity, problem solving, social intelligence, and emotional stability.</p> <p>Working with the natural patterns found in nature (such as the harmonic structure of sound and the golden mean) naturally resonate these patterns of perfection into the individual – physically, mentally, emotionally and spiritually.</p>
Overall Connection  ➤ <b>Career</b>	Many different scientific and technological fields require knowledge of geometry. Especially in the more advanced and specialized study fields the use and

	knowledge of geometry is essential to excelling.
Mental/ Emotional Connection ➤ <b>Creativity</b>	Working with shapes and geometric patterns creates new neuronal pathways in the brain that enhance creativity. Once established, these pathways will manifest in creative thinking in other fields of work and play.
Mental Connection ➤ <b>Focus and Concentration</b>	Sufficient focus and concentration on something will fire neurons in new patterns, creating neural pathways that support cognition.
Mental Connection ➤ <b>Whole Brain Synchronization</b>	Music, rhythm, and geometry engage both sides of your brain and help them work together, creating whole brain synchronization. This stimulates the corpus callosum, strengthening the bridge between the two brain hemispheres. Whole brain functioning improves cognition, focus, memory, creative thinking, problem solving, overall mental health, and the ability to perceive connections between seemingly contradictory concepts.
Mental Connection ➤ <b>Analytical Skills</b>	Geometry assists in developing important analytical skills. Knowing how to apply and understand the relationship between shapes and sizes makes one better prepared to analyze when and how to use them in one's everyday lives. Analytical skills improve learning, decision making, and problem solving.
Spiritual Connection ➤ <b>Spiritual Awareness</b>	Working with geometry and mandalas increases personal awareness and meditative states. Mandalas are specific shapes used by various traditions to represent the universe, thereby creating a sense of connection with a greater whole.



<p>Sensory Refinement</p> <ul style="list-style-type: none"> <li>➤ <b>Spatial Awareness</b></li> </ul>	<p>Visually locating the source of a sound aids in developing spatial awareness, an essential cognitive skill that plays an important role in overall perception. Spatial awareness also plays a key role in auditory perception.</p> <p>Working with shape, dimension, and geometric pattern improves spatial understanding and awareness. This increases the brains ability to perceive and appreciate the role of shape and dimension in any given surrounding, allowing for an advanced understanding of space.</p> <p>Experiencing the microcosmic expressions of the Universe through geometry heals the split between the cosmos and ourselves, creating a sense of unity and wholeness.</p>
<p>Sensory Refinement</p> <ul style="list-style-type: none"> <li>➤ <b>Novelty</b></li> </ul>	<p>The auditory system adapts in response to novel stimuli, allowing for neural plasticity, a key feature of development throughout the nervous system.</p>

### Future Learning:

## **Measuring the Golden Mean in the Body**

### **#T4-15**

#### **Track 4: Geometry**

#### **Category: Golden Mean and Fibonacci**

**Age:** 12-18

**Group/Individual:** Group

**Materials:** Measuring Tape \* Calculator

**Prerequisites:**

- “Counting Spirals”

**Teacher Preparation:**

- Practice the exercise on yourself.

**Repetition and Duration:** Once

**Presentation:**

### **Measuring the Golden Mean in the Body**

1. Have the students choose a partner.
2. Have them measure one another's height, by putting a ruler or book on the top of the head and measuring the distance to the floor. Have them write down the measurements they get.
3. Next, have them measure each other from navel to toe, by putting a finger in the belly button and measuring from the finger to the floor. Have them write down the measurements they get.
4. Have the students divide their navel to toe measurement by their height and write the number down.
5. Have them measure the length of the hand, by flexing the wrist and find the whole between the joints and measure from there to the tip of the fingers.
6. Have them measure one another's forearm, by putting an elbow on a table and measuring from the same spot on the wrist to the table.

7. Have the students divide their hand length by their forearm length and write the number down.
8. Have them measure each other from shoulder to shoulder, looking for the joint in the shoulders where the arm starts and measuring between those two joints.
9. Have them measure each other's arm length, from the same shoulder joint to their finger tip.
10. Have the students divide their shoulder to shoulder length by their full arm length and write the number down.
11. Have the students compare the numbers they got by dividing one body part into another. These should normally fall within the range of .59 to .7. Have them compare these numbers to the golden mean ratio of  $1/1.618 = .618$ . How close are they to the golden mean?
12. Calculate the proportions of a giant if he had perfect golden mean proportions 1 to 1.618. If the Giant is 10 feet tall, how long will it be from navel to toe? If the Giant's hands are two feet long, how long will their arms be?

**Control of Error:**

**Language:** Golden Mean \* Measurement

POINTS OF INTEREST	DEVELOPMENTAL VALUE
Count the number of spirals out loud to help keep track of the numbers.	
Watch for that "AHA" moment when they realize that all spirals in plants are always Fibonacci numbers.	

PURPOSE	RESEARCH AND ASSUMPTIONS
Overall Connection  <b>Observation Skills</b>	The primary purpose of the study of geometry is to expand observation skills -- To be able to recognize patterns in seemingly chaotic things. To understand the underlying structure for creative work. To be able to find coherence and harmony in order to feel more in the body and emotions. And spiritually, to be able to connect to nature and the Universe

	more. “You can learn everything you need to know by observing nature” - Pythagoras
Overall Connection ➤ <b>Presence</b>	Working with geometry and mandalas increases personal awareness and meditative states. Mandalas are specific shapes used by various traditions to represent the universe, thereby creating a sense of connection with a greater whole.
Overall Connection ➤ <b>Coherence</b>	Engaging with geometry uses both sides of the brain and helps them to work together, resulting in greater coherence. Experiencing the microcosmic expressions of the Universe heals the split between the cosmos and ourselves, creating a sense of unity and wholeness.
Overall Connection ➤ <b>Musicality</b>	Seeing harmony visually enhances harmony in music creation.
Overall Connection ➤ <b>Connection to the Natural World</b>	<p>Working with shapes and geometric patterns promotes a greater appreciation of nature and the universe, as the student begins to see how these universal building blocks repeat in many places throughout nature and man-made structures. Connection with the natural world creates a greater sense of harmony and interconnectedness, allowing the student to develop a greater perspective of the whole. Experiencing reality from this expanded perspective synchronizes the brain hemispheres, which enhances creativity, problem solving, social intelligence, and emotional stability.</p> <p>Working with the natural patterns found in nature (such as the harmonic structure of sound and the golden mean) naturally resonate these patterns of perfection into the individual – physically, mentally, emotionally</p>

	and spiritually.
Overall Connection ➤ <b>Career</b>	Many different scientific and technological fields require knowledge of geometry. Especially in the more advanced and specialized study fields the use and knowledge of geometry is essential to excelling.
Mental/ Emotional Connection ➤ <b>Creativity</b>	Working with shapes and geometric patterns creates new neuronal pathways in the brain that enhance creativity. Once established, these pathways will manifest in creative thinking in other fields of work and play.
Mental Connection ➤ <b>Focus and Concentration</b>	Sufficient focus and concentration on something will fire neurons in new patterns, creating neural pathways that support cognition.
Mental Connection ➤ <b>Whole Brain Synchronization</b>	Music, rhythm, and geometry engage both sides of your brain and help them work together, creating whole brain synchronization. This stimulates the corpus callosum, strengthening the bridge between the two brain hemispheres. Whole brain functioning improves cognition, focus, memory, creative thinking, problem solving, overall mental health, and the ability to perceive connections between seemingly contradictory concepts.
Mental Connection ➤ <b>Analytical Skills</b>	Geometry assists in developing important analytical skills. Knowing how to apply and understand the relationship between shapes and sizes makes one better prepared to analyze when and how to use them in one's everyday lives. Analytical skills improve learning, decision making, and problem solving.
	Working with geometry and mandalas

<p>Spiritual Connection</p> <p>➤ <b>Spiritual Awareness</b></p>	<p>increases personal awareness and meditative states. Mandalas are specific shapes used by various traditions to represent the universe, thereby creating a sense of connection with a greater whole.</p>
<p>Sensory Refinement</p> <p>➤ <b>Spatial Awareness</b></p>	<p>Visually locating the source of a sound aids in developing spatial awareness, an essential cognitive skill that plays an important role in overall perception. Spatial awareness also plays a key role in auditory perception.</p> <p>Working with shape, dimension, and geometric pattern improves spatial understanding and awareness. This increases the brains ability to perceive and appreciate the role of shape and dimension in any given surrounding, allowing for an advanced understanding of space.</p> <p>Experiencing the microcosmic expressions of the Universe through geometry heals the split between the cosmos and ourselves, creating a sense of unity and wholeness.</p>
<p>Sensory Refinement</p> <p>➤ <b>Novelty</b></p>	<p>The auditory system adapts in response to novel stimuli, allowing for neural plasticity, a key feature of development throughout the nervous system.</p>

### Future Learning:

**12-18 YEARS**

**TRACK 5**  
**EMOTIONAL EXPRESSION**

**Steady Beat Vocal Rhythms**  
**#T5-7**

**Track 5: Emotional Expression**  
**Category: Voice Expression**

**Age:** 12-18 years

**Group/Individual:** Group

**Materials:** List of Vowel/Consonant Combinations

**Prerequisites:**

- “Toning Long Vowel Sounds”

**Teacher Preparation:**

- “Working with the Child Who is Sensitive to Sound”
- ”Guidelines for Toning: How to Protect Your Voice”
- “Voice in the Body”

**Repetition and Duration:** Every other month (Progress through variations each time)

**Presentation:**

**4 Beat Vowel Rhythms**

1. Let the children know that you are going to create a vocal rhythm. Tell them to listen first and then make the same rhythm in sync with you.
2. Choose a rhythm that feels comfortable for you. To keep a steady rhythm, tap on your leg during the exercise, especially during the pauses in vocalization. You can also use a metronome.
3. Exaggerate the lip movements for each vowel sound.
4. Tone each vowel sound (*Uu, Oh, Ah, Eh, and Ee*) in a 4-beat sequence, 4 times. Between each repetition pause for 4 beats. The first of the 4 is done to demonstrate. Have the children join you for the last 3. .

*Uu Uu Uu Uu* (tap 1, 2, 3, 4) *Uu Uu Uu Uu* (tap 1, 2, 3, 4)...

*Uu Uu Uu Uu* (tap 1, 2, 3, 4) *Uu Uu Uu Uu* (tap 1, 2, 3, 4)... PAUSE

*Oh Oh Oh Oh* (tap 1, 2, 3, 4) *Oh Oh Oh Oh* (tap 1, 2, 3, 4)...

*Oh Oh Oh Oh* (tap 1, 2, 3, 4) *Oh Oh Oh Oh* (tap 1, 2, 3, 4)... PAUSE

*Ah Ah Ah Ah* (tap 1, 2, 3, 4) *Ah Ah Ah Ah* (tap 1, 2, 3, 4)...



*Ah Ah Ah Ah* (tap 1, 2, 3, 4) *Ah Ah Ah Ah* (tap 1, 2, 3, 4)... PAUSE

*Eh Eh Eh Eh* (tap 1, 2, 3, 4) *Eh Eh Eh Eh* (tap 1, 2, 3, 4)...

*Eh Eh Eh Eh* (tap 1, 2, 3, 4) *Eh Eh Eh Eh* (tap 1, 2, 3, 4)... PAUSE

*Ee Ee Ee Ee* (tap 1, 2, 3, 4) *Ee Ee Ee Ee* (tap 1, 2, 3, 4)...

*Ee Ee Ee Ee* (tap 1, 2, 3, 4) *Ee Ee Ee Ee* (tap 1, 2, 3, 4)... PAUSE

5. Note when students are off rhythm. If they are, slow down the rhythm.

### **Alternating Long and Short Vowel Rhythms**

1. Make the vowel sounds *Uu, Oh, Ah, Eh, Ee* alternating between long and short duration.
2. Begin with *Uuu*. Make one long sound followed by 4 short sounds repeated 2 times. Pause for a count of 4 between each of the 4 short rhythmic sounds.

*Uuuuuuuuuuuuuuu, Uuu Uuu Uuu Uuu (1, 2, 3, 4) Uuu Uuu Uuu Uuu (1, 2, 3, 4)*  
*Uuu Uuu Uuu Uuu (1, 2, 3, 4) Uuu Uuu Uuu Uuu*

### **Consonant Rhythms**

1. Choose a rhythm that feels comfortable for you. If you need help keeping a steady rhythm, try tapping on your leg.
2. Create a simple rhythm by using consonants. Do each 4 beat sequence twice. Between each repetition pause for 4 beats. Keep tapping the same rhythm during the pauses between the consonant sounds. The first of the 4 is done to demonstrate. Have the children join you for the last 3 in sync.

*Ba Ba Ba Ba* (1, 2, 3, 4) *Ba Ba Ba Ba* (1, 2, 3, 4)...

*Da Da Da Da* (1, 2, 3, 4) *Da Da Da Da* (1, 2, 3, 4)...

*Ga Ga Ga Ga* (1, 2, 3, 4) *Ga Ga Ga Ga* (1, 2, 3, 4)...

*La La La La* (1, 2, 3, 4) *La La La La* (1, 2, 3, 4)...

*Ma Ma Ma Ma* (1, 2, 3, 4) *Ma Ma Ma Ma* (1, 2, 3, 4)...

*Pa Pa Pa Pa* (1, 2, 3, 4) *Pa Pa Pa Pa* (1, 2, 3, 4)...

3. Exaggerate the lip movements for each consonant sound.
4. If doing Call and response show the listening ear as you do the first rhythm so the children listen clearly to hear and understand the consonants, rhythm and pauses.

5. For Call and Response Do each 4 beat sequence twice. Pause as the children repeat.

<i>Ba Ba Ba Ba</i>	Children: <i>Ba Ba Ba Ba</i>
<i>Ba Ba Ba Ba</i>	Children: <i>Ba Ba Ba Ba</i>
<i>Da Da Da Da</i>	Children: <i>Da Da Da Da</i>
<i>Da Da Da Da</i>	Children: <i>Da Da Da Da</i>
<i>Ga Ga Ga Ga</i>	Children: <i>Ga Ga Ga Ga</i>
<i>Ga Ga Ga Ga</i>	Children: <i>Ga Ga Ga Ga</i>
<i>La La La La</i>	Children: <i>La La La La</i>
<i>Ma Ma Ma Ma</i>	Children: <i>Ma Ma Ma Ma</i>
<i>Ma Ma Ma Ma</i>	Children: <i>Ma Ma Ma Ma</i>
<i>Pa Pa Pa Pa</i>	Children: <i>Pa Pa Pa Pa</i>
<i>Pa Pa Pa Pa</i>	Children: <i>Pa Pa Pa Pa</i>

### 3-Beat Rhythms

1. Repeat the above exercise with a 3 beat rhythm.

*Ba Ba Ba (1, 2, 3) Ba Ba Ba (1, 2, 3)...*

or for Call and Response:

*Ba Ba Ba*                      Children: *Ba Ba Ba*

2. Repeat each group of consonants 2 times.

### 2 Vowels

1. Alternate between two vowels:

*Uu, Uh, Uh, Uh (1, 2, 3, 4) Ah, Ah, Ah, Ah (1, 2, 3, 4)...*

Or

*Uu, Ah, Uh, Ah (1, 2, 3, 4) Uh, Ah, Uh, Ah (1, 2, 3, 4)...*

2. Try several different vowel combinations from the “2 Vowel Chart.”

### 3 Vowels

1. Using a 3 beat rhythm, alternate between three vowels:

*Uu, Uu, Uu (1, 2, 3) Ah, Ah, Ah (1, 2, 3) Ee, Ee, Ee (1, 2, 3)...*

Or

*Uu, Ah, Ee (1, 2, 3) Uh, Ah, Ee (1, 2, 3)...*

2. Try several different vowel combinations from the “3 Vowel Chart.”

### Consonant and 2 Vowel Combinations

1. Using one consonant, alternate between two vowels:

*Buu, Buu, Buu, Buu (1, 2, 3, 4) Boh, Boh, Boh, Boh (1, 2, 3, 4)...*

Or

*Buu, Boh, Buu, Boh (1, 2, 3, 4) Buu, Boh, Buu, Boh (1, 2, 3, 4)...*

2. Try several different consonant/vowel combinations from the “2 Consonant/Vowel Combination Chart.”

### Consonant and 3 Vowel Combinations

1. Using a 3 beat rhythm, alternate between three vowels on one consonant:

*Buu, Buu Buu (1, 2, 3) Boh, Boh, Boh (1, 2, 3) Bah, Bah, Bah (1, 2, 3)*

Or

*Buu, Boh, Bah (1, 2, 3) Buu, Boh, Bah (1, 2, 3)...*

2. Try several different consonant/vowel combinations from the “3 Consonant/Vowel Combination Chart.”

### 4 Vowels

1. Alternate between four vowels:

*Uu, Uu, Uu, Uu (1, 2, 3, 4) Oh, Oh, Oh, Oh (1, 2, 3, 4)...*  
*Ah, Ah, Ah, Ah (1, 2, 3, 4) Ee, Ee, Ee, Ee (1, 2, 3, 4)...*

Or

*Uu, Oh, Ah, Ee (1, 2, 3, 4) Uu, Oh, Ah, Ee (1, 2, 3, 4)...*

2. Try several different vowel combinations from the “4 Vowel Chart.”

### **Consonant and 4 Vowel Combinations**

1. Using one consonant, alternate between four vowel combinations:

*Buu, Buu, Buu, Buu (1, 2, 3, 4) Boh, Boh, Boh, Boh (1, 2, 3, 4)...*  
*Beh, Beh, Beh, Beh (1, 2, 3, 4) Bee, Bee, Bee, Bee (1, 2, 3, 4)...*

Or

*Buu, Boh, Beh, Bee (1, 2, 3, 4) Buu, Boh, Beh, Bee (1, 2, 3, 4)...*

2. Try several different consonant/vowel combinations from the “4 Consonant/Vowel Combination Chart.”

### **Different Tempos**

- a. When comfortable, try the above exercises at different tempos.
- b. Try slow, medium, and fast rhythms.
- c. Go progressively from really slow to really fast, until no one can keep up. Keep this fun and silly.

**Language:** Consonant \* Vowel \* 3 beat \* Tempo \* Call and Response \* Alternate

POINTS OF INTEREST	DEVELOPMENTAL VALUE
<b>Volume:</b>  Note how the volume of your toning affects the children – creating calmness or activation.	
<b>Keep a Steady Beat:</b>  If a child becomes agitated at all, make sure	Consistent rhythms create steady brainwaves that entrain the child into a state of physical, mental, and emotional coherence, resulting in

your rhythm is consistent. If necessary, use a metronome to learn to keep a steady beat rhythm.	overall peace and harmony.
<b>Disengagement:</b>  Note when students are unengaged. Adjust exercise accordingly. Children will engage over time.	

PURPOSE	RESEARCH AND ASSUMPTIONS
Overall Connection:  ➤ <b>Presence</b>	The quality of being present creates focused attention on the child's sounds, movements, and reactions. This establishes a basis for attachment and bonding that will aid in the development of peace, awareness, emotional intelligence, self-confidence, and social connectedness.
➤ <b>Coherence</b>	Consistent tones create steady brainwaves that entrain the child into a state of physical, mental, and emotional coherence, resulting in overall peace and harmony. This coherent state strengthens immunity and overall health, while also generating a sense of bonding. Vocalizing a consistent tone slows down the heart rate and respiration, while synchronizing brainwaves to help release tension and create a coherent state in the mind and body.
➤ <b>Consistency</b>	Consistent rhythms entrain the child into peace, creating physical and emotional stability through the development of steady brainwaves, thought patterns, and focus. This stability strengthens immunity and overall health, while also generating a sense of bonding. In addition, the development of in sync timing is foundational for cognitive thought, movement, sensory response, and vital functions.

	<p>Repetitive speech catalyzes a parasympathetic response of the nervous system and increased vagal tone by stimulating the vagus nerve.</p>
<p>Emotional Connection:</p> <ul style="list-style-type: none"> <li>➤ <b>Emotional Engagement</b></li> </ul>	<p>Consistent emotional engagement supports the integration of multisensory stimuli, social connection, self-regulation, self-awareness, self-esteem, and empathy. Additionally, emotional excitement created through these engagements enhances memory and learning. Emotionally engaging with nonverbal communication (body language, facial expression, eye contact, tone, and intention) aids in right brain development.</p>
<ul style="list-style-type: none"> <li>➤ <b>Emotional Stability</b></li> </ul>	<p>Consistent rhythms and tones entrain the brain into a coherent state that supports emotional stability. When consistent tones or harmonious melodic intervals are listened to or produced by the voice they create emotional and physical harmony. Emotional stability contributes to overall well-being, self-confidence, sense of security, emotional intelligence, and positive social behavior.</p>
<ul style="list-style-type: none"> <li>➤ <b>Confidence and Self-esteem</b></li> </ul>	<p>Secure attachment supported by emotional engagement provides a foundation for developing confidence and self-esteem. Confidence and healthy self-esteem effect overall well-being, playing an important role in feelings of security, acquiring and mastering new skills, likelihood to succeed in the world, and forming healthy relationships.</p>
<p>Mental Connection:</p> <ul style="list-style-type: none"> <li>➤ <b>Brainwave Entrainment</b></li> </ul>	<p>Consistent tones and rhythms create brainwave entrainment, a process whereby the brain synchronizes to the frequency of the external stimuli. This allows the brain to entrain into certain brainwave states, such as delta, theta, alpha, and beta. These brainwave states have</p>

	<p>been proven to enhance sleep, meditation, creativity, presence, focus, learning, and mental processing.</p>
<p>➤ <b>Whole Brain Synchronization</b></p>	<p>Music, rhythm, and geometry engage both sides of your brain and help them work together, creating whole brain synchronization. This stimulates the corpus callosum, strengthening the bridge between the two brain hemispheres. Whole brain functioning improves cognition, focus, memory, creative thinking, problem solving, overall mental health, and the ability to perceive connections between seemingly contradictory concepts.</p>
<p>➤ <b>Speech and Language Skills</b></p>	<p>Auditory discrimination of vowel sounds is a necessary foundation for the future development of speech and language skills. Word associations with vowel sounds further support language learning.</p> <p>Rhythm exercises support future language learning, as similar to music, language has strong rhythmic patterns. The timing of syllables in language helps define one speech sound from another and it's the ability to identify these differences that helps babies learn to speak.</p>
<p>Sensory Refinement:</p> <p>➤ <b>Auditory Awareness and Stimulation</b></p>	<p>Auditory stimulation is important for normal brain growth and connectivity.</p> <p>Non-auditory changes, such as attention, memory, and cognition, play an important role in auditory development.</p>
<p>➤ <b>Temporal Awareness</b></p>	<p>Differentiating between short and long sounds is important for auditory processing and the optimal development of temporal awareness. The ability to differentiate short and long sounds involves the awareness of time, which</p>

	serves as an important aspect of language learning and the development of social intelligence. It also contributes to speech and language skills.
➤ <b>Auditory-Visual Integration</b>	Visually locating the source of a sound in space enhances auditory-visual integration, supporting optimal sensory development important for preverbal logic and language learning.
➤ <b>Multisensory Integration</b>	Multi-sensory input and output create higher brain functioning. Infants can perceive emotions as they learn to discriminate these emotions in multimodal contexts. Attention to relationships between faces, tones of voice, and emotional states develops with experience.
➤ <b>Novelty</b>	The auditory system adapts in response to novel stimuli, allowing for neural plasticity, a key feature of development throughout the nervous system.

### Future Learning:

- Nonverbal and preverbal communication, language preparation
- Developing steady beat rhythms for playing more complex rhythms
- Emotional stability