# BAIP/Brain-targeted Teaching® Learning Module

**Academic Content:** The Science of Sound: Students will be exploring sound, defining energy, describing energy transfer, and identifying the properties of sound through percussion.
**Learning Unit Title:** Music to My Ears
**Grade Level(s)**: 4
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## Learning Unit Overview: (Overarching Learning Unit content; Essential questions; Expected student understandings)

*Music to My Ears* asks students to consider the essential question: *How can we produce sound to make music?* In this unit, students explore sound through music while studying how energy, materials, and the laws of physics all impact the experience of sound on the human (and animal!) ear.

Music, as well as sound, is all around us and is an important part of students' everyday lives. In this unit, the BAIP team amplifies real-world applications of the science of sound through providing accessible tools, resources, and activities for creating music. Our percussion-based offerings aim to support teachers and students of any musical background as they work toward the final design challenge of the unit and apply their gained knowledge of how sound can be produced to make music.

Each percussion-based arts integrated overlay, offering, and extension works to bridge the gap between making sounds and creating intentionally organized sound, or music. Through accessible body-percussion exercises and activities that utilize everyday classroom materials students gain required 4th grade SABES content knowledge, including the ability to:

- Define a sound wave, explain how sound is produced (compression and rarefaction), and how humans feel the sounds they make.
- Explain vibration as waves of energy and how materials impact the speed at which sound travels.
- Demonstrate different pitches and loudness by changing the frequency and amplitude.
- Create a musical instrument and use music notation to perform an original composition.

At BAIP, we believe in teaching to the whole child: academically, environmentally, socially, and emotionally. Creating joy-filled musical experiences through arts integration and the Brain-Targeted Teaching® model allows us to do just that.

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## BT-1: Setting the Emotional Climate for Learning

Brain-Targeted Teaching® (BTT) Learning Modules prioritize building positive and affirming learning environments. Techniques like "Rhythm of the Day" included in this module establish and promote:

- Unity and safety through classroom community building and cultural inclusiveness
- A relaxed, enjoyable atmosphere for productive cognitive work and achieving creative "flow states"
- Social Emotional Learning strategies that support the the CASEL Core Competencies: *self-awareness, self-management, social awareness, relationship skills, and responsible-decision making*
- Greater accessibility to heart-brain coherence by reducing cortisol and syncing the heart and brain
- Self-direction through student choice
- Curiosity, wonder, exploration, risk taking, and self-direction through student choice, questioning, and the promotion of a growth mindset
- Student affirmation through consistent, positive feedback language

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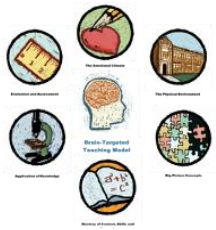
## BT-2: Creating the Physical Environment for Learning

A conducive learning environment is prepared through deliberate planning that incorporates novelty, order, and aesthetic elements in each unit. The balance between consistency and novelty is crucial: novelty stimulates creativity, while a familiar foundation provides stability.

For this module, it is suggested:

- Student desks are arranged in a circle formation, or, space is made for a standing circle while engaging in percussion activities
- Soft background sound/music played during work time



- Music/sound specific word wall is displayed
- Driving Question board is present throughout the unit, displaying the driving question and allowing space for students to contribute to a growing concept map as the unit progresses. We suggest keeping sticky notes accessible near the board to increase engagement (students can post new ideas, questions, prior knowledge, etc.)
- Student work display board is routinely updated with both finished works and in-progress process exhibits of assignments
- Soft lighting options are made available if possible

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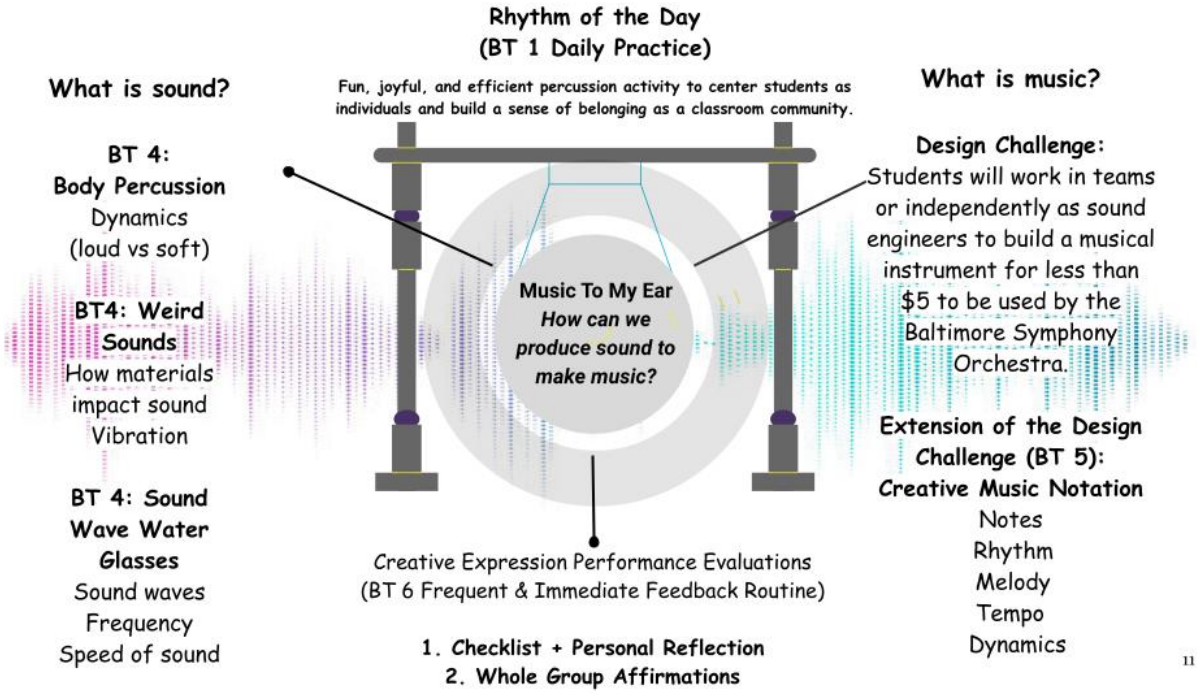
**BT-3: Designing the Learning Experience**

Concept mapping is a pictorial method of big picture planning. By using a thematic graphic organizer, this module lays out how the Brain Targets 1, 4, 5, and 6 work together with arts integrative activities to achieve this SABES unit's learning goals and objectives.

Concept mapping can also be used with students to help bridge prior knowledge and their own experiences with new understandings.

This BAIP module's concept map below displays:

- The SABES unit driving question in the center.
- The Brain Target 4 percussion activities on the left hand side with notes on how they serve as the vehicle to help students achieve the unit's learning goals.
- A Brain Target 5 Design Challenge Extension is noted on the right hand side of the map, serving as an opportunity to use percussion to bridge the unit's two sub-driving questions: *What is sound?* & *What is music?*
- The Brain Taget 1 Setting the Day (Rhythm of the Day) activity is noted at the top of the map, indicating its overarching tone setting objective that teachers can facilitate daily throughout the unit.
- Finally, the Brain Target 6 feedback routines are noted on the bottom center of the map, displaying how they anchor and support each aspect of the students' learning experience throughout the unit.

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## BT-4: Teaching for Mastery of Skills, Content, and Concepts

Brain Target 4 speaks to the educator's aim to facilitate knowledge acquisition, where information transitions from short-term to long-term memory. Brain research highlights how neural networks for memory grow stronger with use. Therefore, the teacher's goal is to "hardwire" vital content by crafting diverse, creative lessons that allow for "repeated rehearsal" of core skills and knowledge areas.

Arts integration is an ideal approach to teaching and learning to meet these aims. As stated, the art form utilized in this BAIP overlay is percussion, defined as musical "instruments" that are played by striking or hitting them to produce sound.

*Activity 1: Body Percussion*

- Objectives:
    - Investigate various sounds and begin to make inferences about the nature and properties of sound.
    - Explore and demonstrate different pitches and loudness (dynamics).
- Strategies:

- Students will explore pitch, dynamics, and rhythm by experimenting with body percussion.
- Benefits (Brain-Targeted Teaching + Arts Integration): This activity effectively combines kinesthetic learning with scientific concepts and music principles, making learning enjoyable and memorable. It encourages students to connect sound and movement, fostering a deeper understanding of auditory principles while encouraging creativity and physical engagement.

*Activity 2: Weird Sounds*

- Objectives:
  - Plan and carry out an investigation to explain why sound travels faster through solids than in liquids or gas.
  - Construct an explanation for how the length of a medium impacts vibration and pitch.
- Strategies:
  - Students will experiment with various classroom materials and textures to create different sounds. They will understand how materials affect pitch, dynamics, and emotions associated with sound. This activity fosters creativity, real-world application, and an understanding of the impact of materials on sound.
  - Benefits (Brain-Targeted Teaching + Arts Integration): This activity allows students to engage their senses and creativity while gaining insights into the relationship between materials, sound, and emotions. It offers an interdisciplinary approach that combines science, music, and psychology, enriching their understanding of the world around them.

*Activity 3: Water Xylophone*

- Objectives:
  - Use evidence from sound stations to explain how sounds travel through a liquid and cause vibrations.
- Strategies:
  - Vibration and Pitch: When a glass is tapped, the water inside vibrates, creating sound. The pitch of the sound is determined by the speed of these vibrations. More water in the glass slows down vibrations, resulting in a lower pitch, while less water allows faster vibrations and a higher pitch.
  - Sound Transmission: Sound travels as vibrations through a medium. In the case of a glass xylophone, vibrations move from the glass to the water and then through the air to our ears. This quick transmission is what allows the perception of sound.
  - Benefits (Brain-Targeted Teaching + Arts Integration): Interdisciplinary Learning: Creating a water glass xylophone involves science, math, design, music, and

engineering concepts. This activity is an excellent way to engage with and integrate multiple fields of knowledge.

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**BT-5: Teaching for Extension and Application of Knowledge**

BT 5 seeks to strengthen deeper thinking and learning by applying skills and content in meaningful, active, real-world tasks.

In *Music to My Ears,* the culminating design challenge states students will work in teams or independently as sound engineers to build a musical instrument for less than $5 to be used by the Baltimore Symphony Orchestra.

This BAIP module overlay, in which students will  be able to use their instruments to create an original composition to be played aloud and displayed visually as music notation, aims to further extend this application of knowledge. As stated in the unit summary, music is an important part of our everyday lives. It is therefore our intention to support students in deepening their personal relationship to music composition and exploring their creativity.

- Objectives:
    - Obtain information about orchestral instruments through observation of the local Baltimore Symphony Orchestra Bucket Band.
    - Research and choose an instrument for the engineering design challenge and determine what materials are needed.
    - Work in teams or independently as sound engineers to design plans for a musical instrument that is less than $5 and could be used by the Baltimore Symphony Orchestra. The process of planning allows an engineer's design ideas to become a final product that meets the criteria and constraints of the challenge.
- Strategies:
    - Students will understand the concept of music as the intentional organization of sound.
    - Students will learn about music notation and its basic elements, including staff lines and rhythm pattern notation.
    - Students will use their created instruments to compose a short musical arrangement based on provided rhythm pattern notation.
    - Students will demonstrate their understanding of the relationship between music notation and sound production by playing their original compositions.

## BT-6: Evaluation of (and for) Learning

Evaluating instruction is as important to the learning process as meaningful learning activities. Most importantly, the Brain-Targeted Teaching Model emphasizes that relevant and timely evaluation is an ongoing, two-way process that begins almost as soon as the students' first introduction to a learning unit.

BT-6 includes the use of oral and written probes, rubrics, student portfolios, student-generated products, performance-based assessments, and student self-reflections. .

To support this aim, this BAIP unit utilizes the following strategies:

- Driving Question board (allows for consistent formative evaluation of students' developing connections)
- BAIP Activity Checklist & Self-Reflection document (allows students to develop key SEL & academic skills by regularly assessing their own growth)
- Whole Group Affirmations Routine (allows for community building and growth mindset development)
- Process Assessment: Final Design Challenge + Music Notation Overlay (allows for reflection on the creative process as a whole, not solely the final product)
- SABES-Aligned Performance-Based Assessments (provides rubric-driven assessment of key science skills gained)
- Teacher/Student Conferences (promotes consistent dialogue between the teacher and students, provides space for student self-advocacy, provides space for teacher to conduct emotional-climate check-ins/specific learning needs)
- Engagement in the arts-integrated experiences are employed as a record of achievement