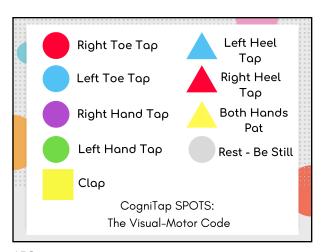


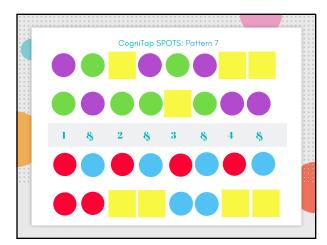
## Cognition is Mediated by the Cerebellum "When we consider brain anatomy, we recognize the importance of the integration of the cortical and subcortical structures of the brain in learning and behavior. We need to keep front of mind that the higher level cognitive systems, rest on the subcortical structures including the limbic system and the cerebellum. Proper integration is needed for high quality learning. As the phylogenetically older of the brain systems, the cerebellum precedes the prefrontal cortex, in the automaticity of learning and behavior. Both are stored in and mediated by the cerebellum." (Kenney & Comizio, 2016)

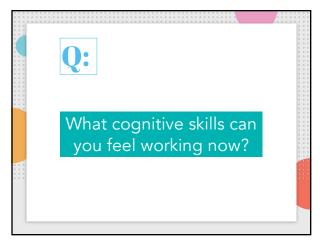




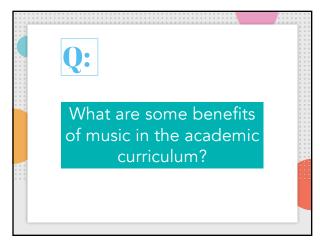












## How Rhythm and Music **Enhance Cognition**

Learning includes recognizing, understanding and responding to

- Tasks of daily living, dressing, cooking, walking to school, playing Reading & writing
  Numeracy
  Spelling and vocabulary
  Homework and projects require sequencing

Rhythm and Tempo provide the opportunity to anticipate, respond,

Timing supports and enhances coordination which underlies cognition.

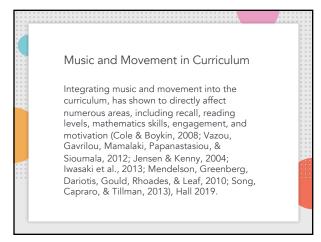
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## Benefits of Music & Movement Training

Music and movement instruction has been shown to engage children's memory, cognitive development, social skills, learning and auditory processing.

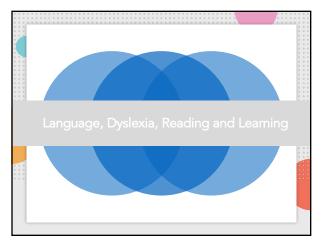
(See - Durront 2017; Miendarzewska, & Trost, 2014)

- Develop fine motor skills
- Develop gross motor skills
- Learn to express emotions
- · Learn how to manage one's body in space
- Improve balance and coordination
- Improve social interaction
- Improve self-regulationIncrease working memory load
- · Increase selective attention









Developmental dyslexia is a childhood learning difficulty that is defined as a specific difficulty in reading and spelling that cannot be accounted for by low intelligence, poor educational opportunity or obvious sensory/neurological damage.

The core cognitive difficulty in developmental dyslexia lies with phonology, as measured by the ability to reflect on the sound structure of words (Snowling, 2000).

Children with dyslexia have difficulty in manipulating sound elements in words and in recognizing shared sounds in words (Ziegler & Goswami, 2005; Ziegler et al., 2010, for recent reviews).

They frequently also have difficulties with phonological short-term memory and rapid naming of familiar word forms (Wagner & Torgesen, 1987; Ziegler et al., 2010).

More recent studies show that the phonological difficulties in dyslexia extend beyond single words to the processing of intonation, syllable stress, speech prosody and speech rhythm (e.g.Goswami, Gerson, & Astruc, 2010; Goswami & Leong, 2013; Goswami et al., 2013b; Leong, Hämäläinen, Soltész, & Goswami, 2011).

