

# Workbook

# Supporting Self-Regulation in Montessori Classrooms

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*Actionable Strategies from an Occupational Therapy Perspective*

Tia Gamelin, OTR/L, ADHD-CCSP, SIPT-C

## **Objectives**

1. Explain how a neurodiversity-informed approach to sensory regulation supports learning and development in Montessori environments.
2. Identify ways that movement and sensory input prepare the brain for attention, engagement, and academic readiness.
3. Apply inclusive, evidence-based sensory strategies to enhance focus, regulation, and participation in Montessori classrooms.

# How Does Sensory Regulation Support Learning and Development?

“  
The brain is hardwired to make connections and learn

## General Population Studies

### Neurodivergence

- 15-20% or 1 in 5 people are neurodivergent<sup>2</sup>
- 1 in 31 children are identified as autistic<sup>1</sup>
- 11.4% or 1 in 9 (17.1 million) children have ADHD<sup>3</sup>
- 1 in 6 children has a developmental delay<sup>5</sup>

### Most common mental health conditions in children ages 3-17 between 2016-2019

- Anxiety- 9.4% (~5.8 million)<sup>4</sup>
- Depression-4.4% (~2.7 million)<sup>4</sup>
- Behavior Problems- 8.9% (~5.5 million)<sup>3</sup>

“  
Sensory experiences refine and shape how the circuits in the brain are built, what those circuits connect to and how efficient those connections become

## Synaptic Pruning

Neurons in autistic brains do not undergo normal pruning during childhood and adolescence, resulting in a higher number of synapses

- This results in an overabundance of synapses, which can lead to hyperconnectivity and potential sensory overload<sup>6</sup>

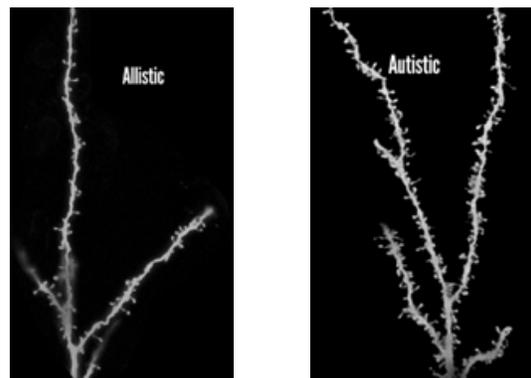


Image Credit: Guomei Tang, PhD, and Mark S. Sonders, PhD, from Columbia University Medical Center

## Key Concepts of Regulation

- Ability to match our body to the environment or task
- Ignore internal sensations that are irrelevant given a task's demands
- Filter out environmental distractions
- Participate and persist in the task or environment

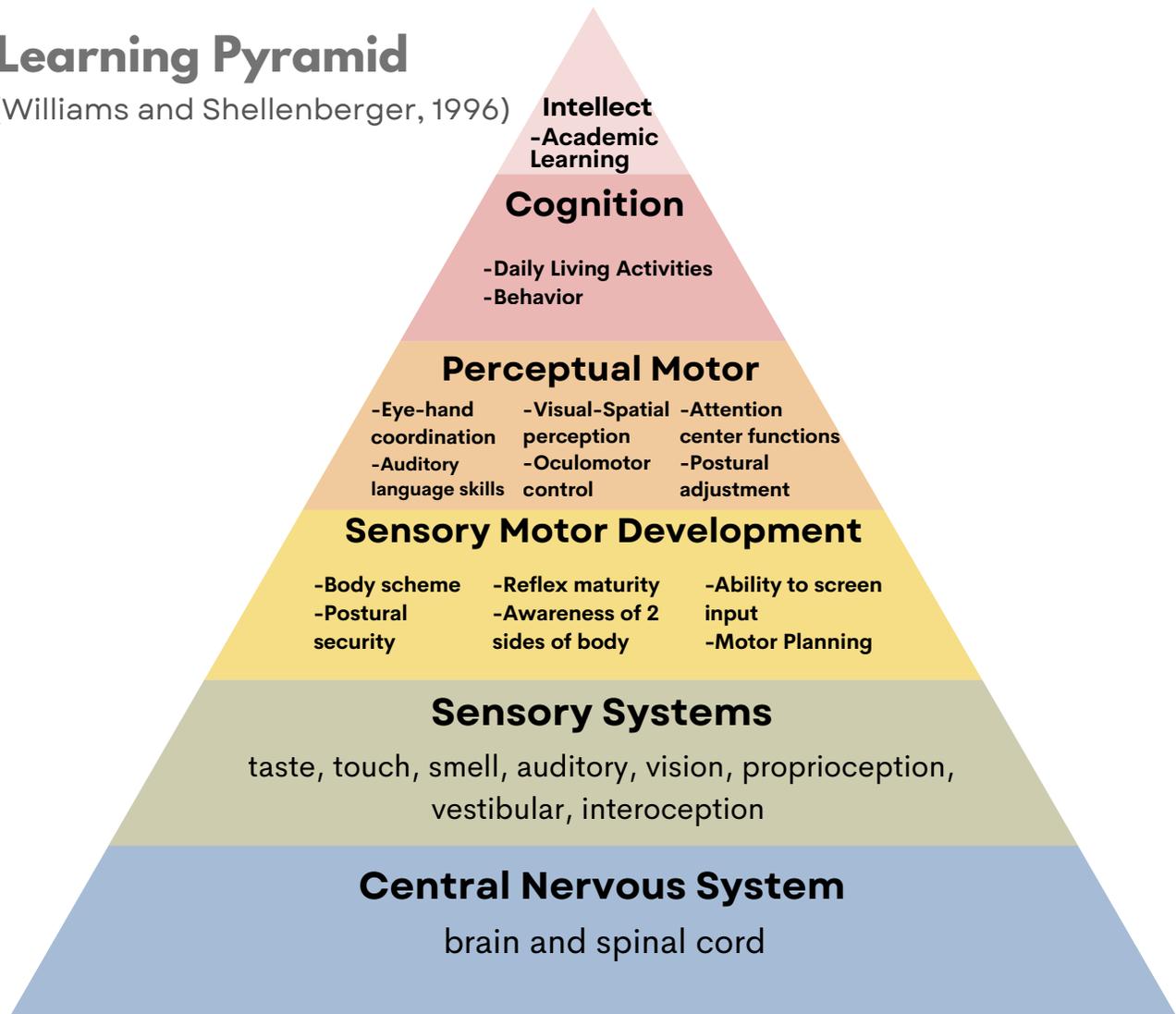
### Co-Regulation

- "Borrowing" the regulated state off of another person's regulated state

**Ayres identified that successful development of sensory integration underpins emotional stability, attention span and activity levels.**

## Learning Pyramid

(Williams and Shellenberger, 1996)



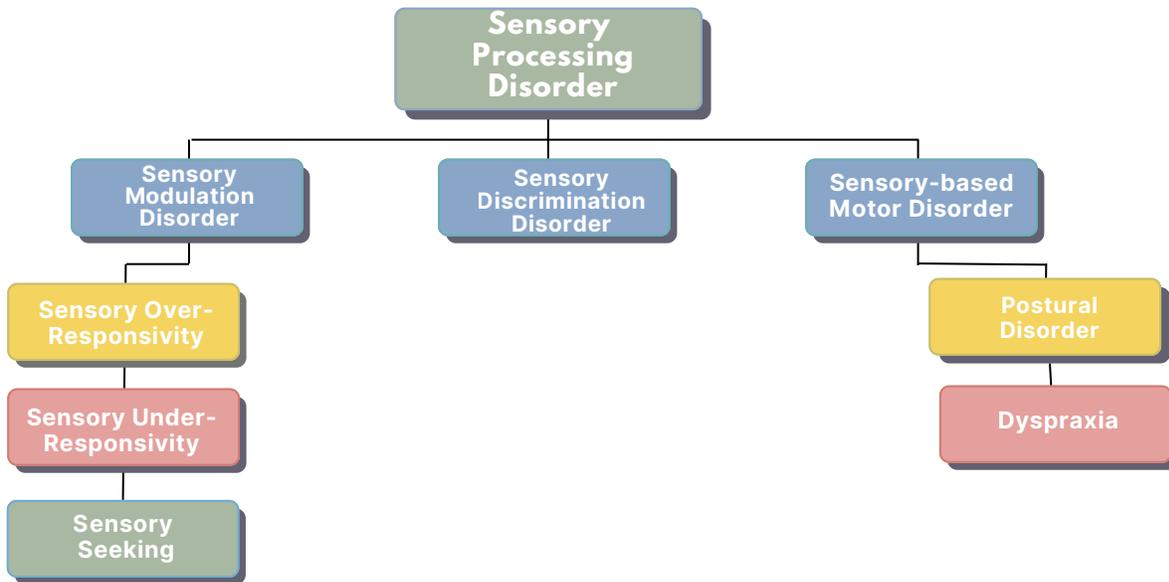
## Learning Pyramid

- How the brain was hardwired from infancy; bottom up approach/back to front
- All learning starts from the senses
- Internal sensations demand priority for survival
- Difficulty in processing senses leads to difficulty in adapting to the demands of the environment

## Sensory Processing Disorders

- Sensory integration difficulties can lead to increased sympathetic nervous system arousal and a heightened stress (fight-or-flight) response.
- Synaptic pruning plays a **crucial role** in self-regulation by refining neural circuits, allowing for more efficient emotional processing and adaptive responses to experiences.

# Sensory Processing Disorders



## Modulation Disorders

**Over-Responder**



A child whose nervous system **detects sensory input too intensely**, becoming easily overwhelmed or distressed by sensations that others find typical.

**Under-Responder**



A child whose nervous system **registers sensory input less efficiently**, appears quiet, slow to react, or disengaged until stimulation increases.

**Sensory Seeker**



A child whose nervous system **craves extra sensory input**, leading them to move, touch, and explore with intensity to stay regulated and focused.

## Sensory Discrimination Disorder

- Difficulty in interpreting the qualities of sensory information such as touch, sound, or body position.
- Often struggle to tell the difference between similar letters or sounds, or use too much or too little force for a task
- Difficulty teasing out sounds and voices especially in competing environments

## Sensory Based Motor Disorder

- "W" sitters, Low muscle tone, slouchers, lots of oral issues, poor fine motor skills, clumsy, can have a hard time navigating around environmental obstacles, articulation challenges, processing challenges, difficulty sequencing the steps of a movement

# “Watching a child makes it obvious that the development of a child’s mind comes through their movements.”

-M. Montessori, The Absorbent Mind

## STRANDS

Engaging in specific sequences of sensory activities helps children who struggle with regulation and attention



Alerting



Organizing



Calming

## Vestibular



- Rotational movement, nodding your head and abrupt and unpredictable movements tend to be more alerting
- Linear movement tends to be more calming
- Branch of the vagus nerve regulates attention and arousal (RAS) shifting weight and changing position
- Vestibular ocular reflex VOR-The VOR helps you maintain a steady perception of the world around you, even though your eyes and head are constantly moving.
- Guides motor movements

## Proprioception



### WHAT WE KNOW

- "The Great Regulator"
- Grading force
- Proxy touch (discerning texture through tool use)
- Right/Left awareness
- Body scheme

## Touch



### WHAT WE KNOW

- Touch system pairs with the visual system
- Related to feelings of physical safety
- Light touch can be very dysregulating
- Deep pressure touch provides calming and grounding input
- Passive vs. Active and regulation
- Stereognosis

## Taste, Smell, Interoception



### WHAT WE KNOW

- Smell is processed in the thalamus, connected to memories and emotion
- Habituate quickly, but still influential in regulation
- Perfumes and air fresheners
- Detection of internal needs and experiences, processed in insula and given meaning via the vagus nerve to get needs met
- Attention

## Neurobiologic Process

If we know these things, we can use these things to obtain a "Just Right State"

# STRANDS



**Body scan**



**Alerting** – to wake up or "re-set" the body and brain



**Organizing** – to support focus and coordination



**Calming** – to settle into a ready-to-learn state



**Return to learn**

## Implementation

Strands are used 2-3x a day and take 10-15 minutes. They are best used:

- First thing in the morning
- Before the work cycle
- After lunch
- Before or after transitions
- As needed to support regulation throughout the day

## Benefits for Students

- Focus and engage
- Re-center/Re-set
- Sequence and persist with a task
- Work through a hard problem
- Prepare for a transition
- Check in with their body and emotions

## Benefits for Teachers

- Opportunity for co-regulation
- Returns to the heart of Montessori's use of integrating movement and sensation to enable learning
- Provides a starting point

# Systematic Observation

## EAR Triangle

### ENVIRONMENT

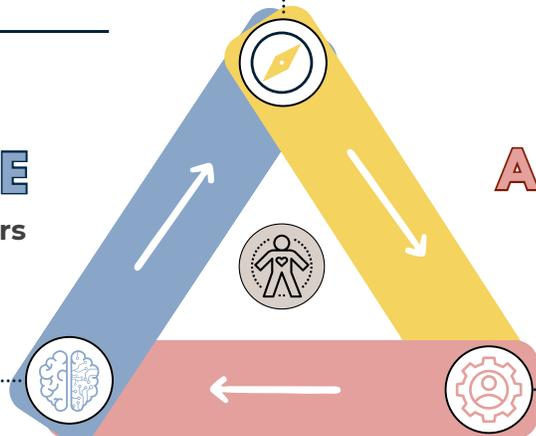
- Temporal
- Physical
- Personal

### RESPONSE

- Adaptive Behaviors
- Insight into E & A
- Builds skills

### ACTIVITY

- Appropriate
- Goal oriented
- Explicit



If interoception (the “tuning-in”) isn’t addressed first, then students are just doing activities without connecting them to what their body actually needs.

# STRANDS

## Body Scan *Goal is to identify internal factors that indicate readiness to learn*

**I wonder if it is hard to focus?** I notice that your body looks wiggly right now, How’s your brain and body feel?”

**I wonder if it is hard to get started?** “I notice that your body looks a little slow-moving or sluggish, how’s your brain/body feeling?”

**“I wonder if it is hard to stay on task?”** “I notice it’s been a while since you’ve chosen a work, How’s your brain/body feel?”

**Choose one** card from **every strand**, **clip them** onto your strand. **When** you’ve **completed** your strand **revisit** these **questions** to build awareness of what “ready to learn” means to each student.



1

### Alerting

Alerting activity strands involve movement to “wake up” or “re-set” the brain and provide information on body awareness to prepare the brain for learning. Effects of this input can last between 6-8 hours.

2

### Organizing

Organizing activity strands involve motor planning, balancing, and movement that supports the brain to integrate the sequence of “acting” and “doing”.

3

### Calming

Calming activity strands that can include tactile input and proprioceptive input release neurotransmitters serotonin and dopamine which play a role in regulating mood and brain function.

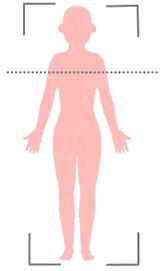
## Ready to Learn *Goal is to create the body brain connection for self regulation and success in the learning environment.*

When the body feels regulated, the brain feels safe, and ready to learn.

Transition to learn should include a visual schedule to restart work cycle and self-monitoring time keeper (time timer) to allow the calming state to persist through activity.

# STRANDS

## Body Scan



Alerting  
**1**



Organizing  
**2**



Calming  
**3**



Over-  
Responders

- Marching in one spot
- Rock-Starfish- (body tuck into ball/rock to full body spread to "star")
- Seated trunk/head rotations
- *Aromatherapy*

- *Aromatherapy*
  - Chamomile
  - Lavender
  - Geranium
  - Vetiver
  - Basil
  - Rosemary
- Walk figure 8
- Chair push ups

- Box breathing
- Simple sorting
- Chair stretches
- *Aromatherapy*
- Yoga
- Touch table/sensory bin
- Visual oil timer
- Sucking on ice



Under-  
Responders

- Over-unders
- Robot Zappers
- Seated rotation
- *Aromatherapy*
  - Peppermint
  - Eucalyptus
  - Lemon
  - Ginger

- Standing on balance board & bounce/catch ball
- Chair push-ups
- Wall walk ups to target with ball

- *Aromatherapy*
- Crunchy snack
- Erasing chalkboard or cleaning tables
- Yoga



Seekers

- Slow motion jumping jacks
- Head-shoulders-knees-toes with a weighted ball
- Concrete-feet hand walk ups on wall

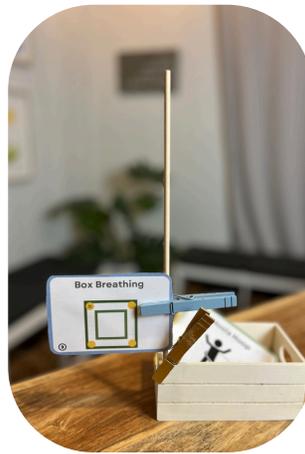
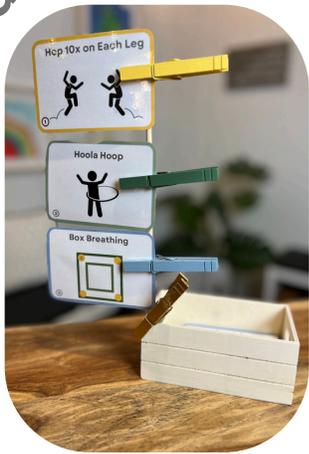
- Balance a bean bag on head; walk an 8
- Tennis ball bounce R/L sides on an 8 or on line
- Single leg balance H/S/K/T

- *Aromatherapy*
  - Ylang Ylang
  - Cedarwood
  - Patchouli
  - Chamomile
- Sand tray/Zen garden
- Fruit leather/chewy snack
- Yoga

# SETTING UP STRANDS

Outdoors

Indoors



## Aromatherapy *Alerting*

- Peppermint
- Eucalyptus
- Lemon
- Ginger

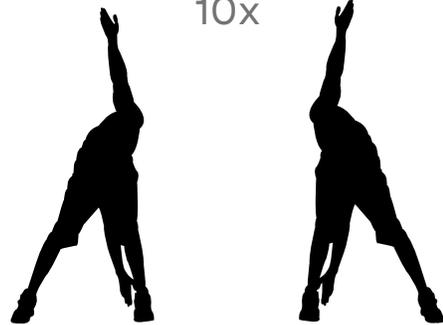


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## Windmills

10x

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## Look Behind Both Sides

10x

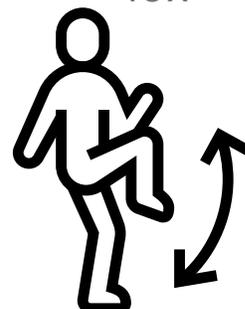
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## High Knees Marching

10x

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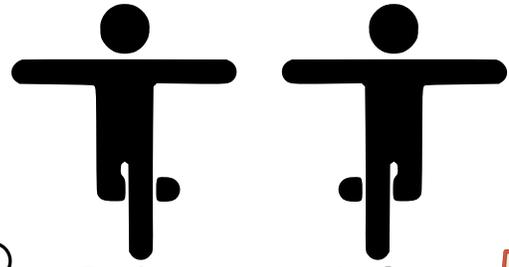
## Bounce/Catch ball

right and left hands 10x



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## Balance On One Leg



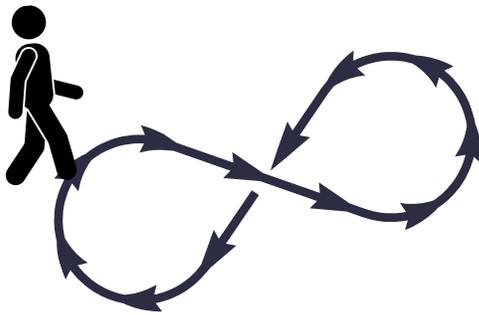
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Right

Left



## Walk a Figure 8



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## Aromatherapy

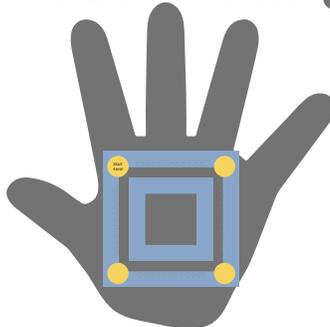
### Organizing

- Chamomile
- Lavender
- Geranium
- Vetiver
- Basil
- Rosemary



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## Box Breathing



③

## Aromatherapy

### Calming

- Ylang Ylang
- Cedarwood
- Patchouli
- Chamomile



③

## Yoga



③



## Chair Stretches



③

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