

The Sensory System

**A Guide to Children's
Development from Birth
to Age 10**



This is an in-depth look at our amazing sensory system and how we process external stimuli to fully function in our everyday lives. Educators and parents can support children by observing their behaviors, using proactive strategies, and responding to their needs in the moment.

You will learn what the sensory system is and how it functions, tips for implementing sensory strategies in the classroom and home, and developmental considerations for children aged 0 to 10 years.

Plus, a full checklist is included to help you observe children in their natural environment.

Part 1 - What is the Sensory System?

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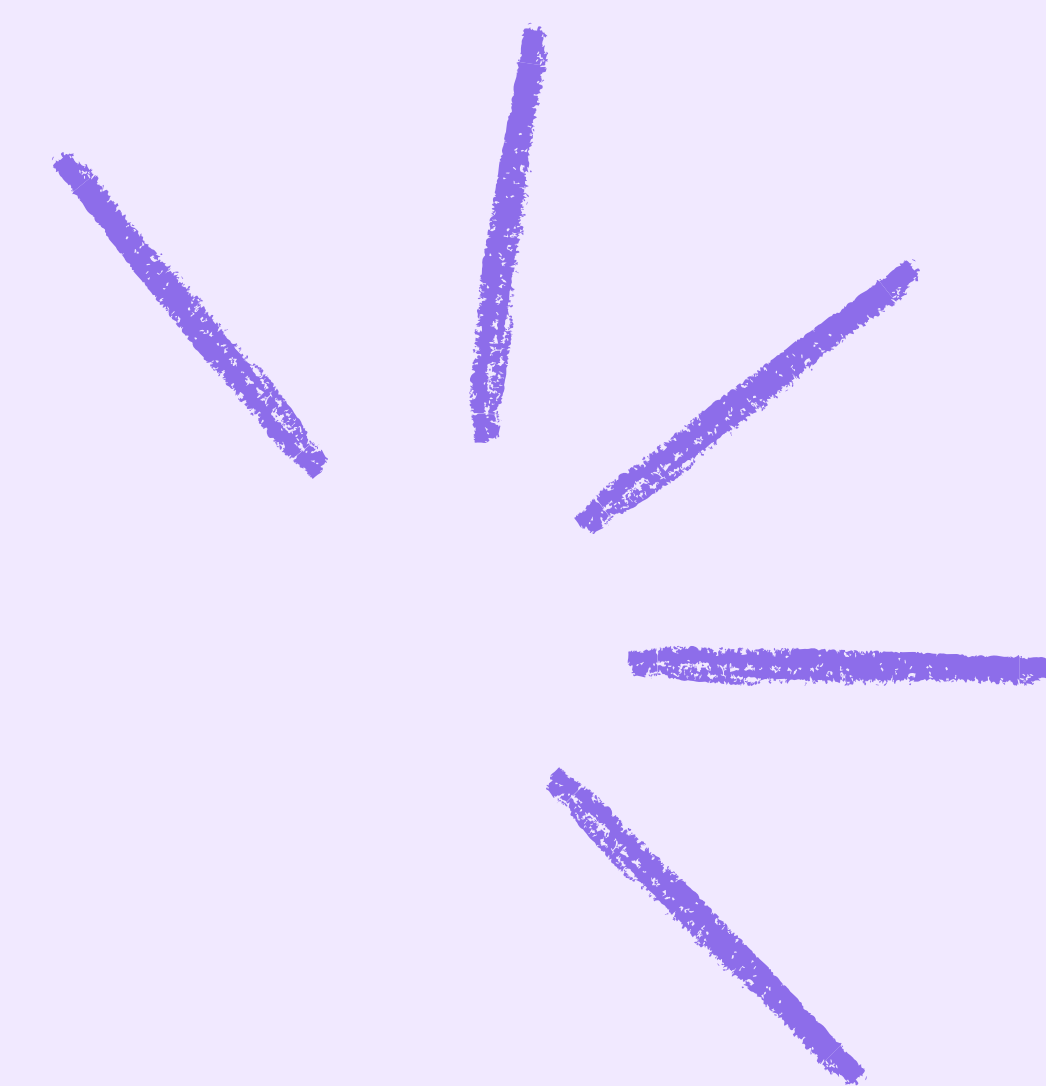
Part 2 - Sensory Processing by Age

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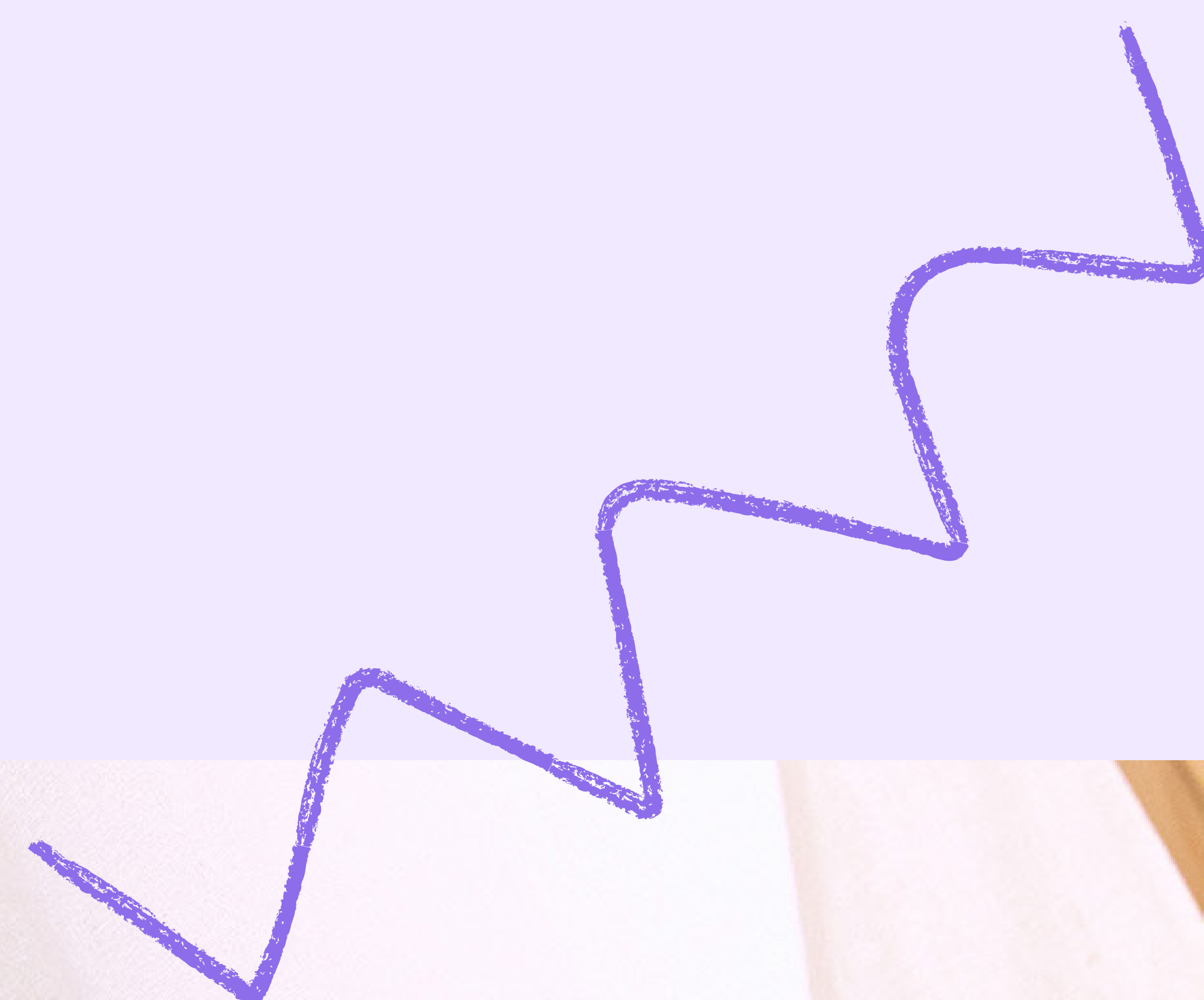
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Part 1



What is the Sensory System?



Understanding the sensory system and how sensory processing can affect a child's education and development is a vital component of educators and parents offering children the support they need.

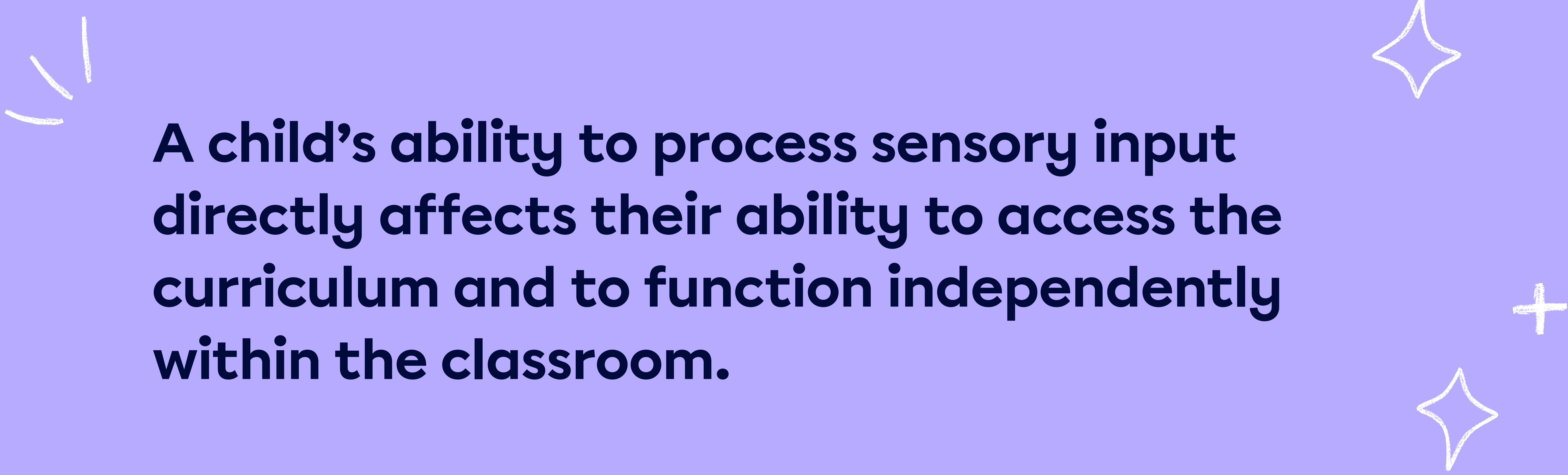
For most children, the sensory system develops through ordinary play and activities. Other children require additional support and strategies to process sensory input. Sensory processing is how our bodies react to auditory (sound), tactile (touch), sight (vision), vestibular (movement), and proprioceptive (body awareness) stimuli. The way in which our brain processes and integrates the information it receives is sensory processing.



Everyone has a unique sensory system. What may be processed as offensive to one person is preferred by another. A good example of this is roller coasters. Some individuals can go on a roller coaster over and over again (sensory seeker), while others avoid roller coasters and may become sick from riding one (sensory avoider). The organization of sensory input is the ability to process sensory stimuli throughout the day. A good indicator of an integrated or organized sensory system is when a child can follow daily expectations with minimal support, such as successfully transitioning from one activity to the next or focusing on a challenging task.

The field of sensory integration was pioneered in the 1970s by Dr. A. Jean Ayres, an occupational therapist and educational psychologist. Ayres (1979) observed, “If a child’s relationship to the earth is not secure, then all other relationships fail to develop optimally.”

Sensory regulation is the ability to process the sensory input that we encounter throughout the day. Infants, toddlers, adolescents, teens, and adults are bombarded with sensory input at all times. Within the school environment, this input can consist of bright lights, being bumped by a peer in a crowded hallway, and the sound of chairs moving.



A child’s ability to process sensory input directly affects their ability to access the curriculum and to function independently within the classroom.

It is important to note that the sensory system is developed at birth; however, the integration of the sensory system occurs between ten and twelve years old. As the sensory system integrates, a child will begin to exhibit independence in their sensory needs. Examples of this would be independently finding a quiet space to work, asking a teacher to close the blinds, moving away from a distraction, or standing to complete work rather than sitting in a chair. Providing children with support throughout the day and prior to becoming dysregulated is key to a child’s success.

Every child who requires support with sensory processing has unique needs. Gathering information about how the child processes sensory input is typically done through observations, journaling, and checklists. When observing a child, it is important to observe them throughout the day in various environments, including times when the child is following the classroom expectations, whether that is during independent or structured time. It is vital to closely monitor what occurred prior to the child becoming dysregulated. You can ask yourself “What happened before the child became upset or overwhelmed?” “Has our routine or schedule changed?” “What was done once the child became upset or overwhelmed to help calm or reorganize the child?” This will help guide the type of sensory input needed at that moment.

Although it is important to look at each child as an individual, many teachers use sensory input to help regulate the entire class. Examples of this would be bringing the energy down in the class following an exciting activity by dimming the lights and doing a Moshi breathing exercise or mindfulness track. Or, energizing the class after they have been sitting for a long time by having them stand and stretch, play rock, paper, scissors, or another activity that requires them to cross midline.



Four Tips for implementing sensory strategies in the classroom

- 1 Following an exciting activity (coming in from recess, an assembly, fire drill), complete a 3- to 5-minute calming Moshi Moment, such as **Simmer Down with Boomer** or **Chop Chop's 5 Minute Chill**.
- 2 Create centers or zones within the classroom for students that offer different sensory experiences. These centers can include reading or writing in a small enclosed space, listening to Moshi Music while working (**Dodo Deep Focus Lounge is a class favorite!**), sitting on large therapy balls as chairs at a table to complete an activity, and using various tactile modalities (clay, shaving cream, sand, etc.).
- 3 Provide movement throughout the day. Movement can be implemented in many different ways as part of the classroom routine, including Moshi Moments. Familiar types of movement can include dancing, marching, or skipping around the classroom, and yoga. Flexible seating can also be provided for different types of movement, such as pillows on the floor or cushions on a chair.
- 4 Use consistent words and phrases to help kids organize and regulate, for example "Close your eyes. One, two, three breathe in. One, two, three breathe out." Moshi Breathing tracks are the perfect way to provide structure and predictability.

All of these strategies are proactive ways to provide sensory input throughout the day. For some children this will be enough; others will require additional sensory input. And if you miss cues that a child is becoming dysregulated, that is okay. You can still provide sensory input to help organize the student. It is important to learn from that moment, reflect and discuss your observations, and develop a plan going forward. The long-term goal is to decrease dysregulation and increase organization and self-regulation.

Part 2

Sensory Processing by Age



Sensory processing and sensory regulation is the ability to process sensory input. We encounter sensory input throughout the day, consisting of auditory (sound), tactile (touch), sight (vision), olfactory (smell), vestibular (movement), and proprioceptive (body awareness).

As we grow and develop, our bodies integrate the input, and we learn strategies to seek input we need. For example, after a long, exhausting day, some of us may seek out quiet and solitude while others may seek out movement and stimulation. We also develop strategies for dealing with input that is noxious or defensive to us, such as by removing tags from shirts or using scent-free detergent. The ability to independently process sensory input comes through life experiences. Many children will independently learn to process sensory input through play and exposure, while other children will require additional support.





When introducing sensory input, it is important to individually look at the child and their reaction to the input. When an infant becomes overstimulated or is unable to process sensory stimuli they will show signs of stressors, such as crying, hiccuping, yawning, sneezing, skin color changes, and extending or bracing their legs. Once these indicators are seen, you should scan the environment and try to locate the stressor, which could be one or more types of stimuli within the environment. Remember when looking for sensory stimuli we are observing tactile (touch), olfactory (smell), auditory (sound), sight (vision), vestibular (movement), and proprioceptive (body awareness). As an infant grows, the signs of overstimulation or inability to process sensory input will look different. Signs may include crying, increased activity level, decreased safety awareness, inability to self soothe, or disruptive sleep patterns. They can also be seen on the opposite end of the spectrum: fearful of movement, high pain tolerance, sleeping for longer than expected, quiet, and limited in affect.

Like infants, when a child has trouble processing sensory input it is important to scan the environment and locate the stressor. Any time a child is not able to organize and process sensory input, it provides a learning moment for a teacher or caregiver. By identifying the source of the stimuli, you can develop a plan. The plan may be as simple as wearing a hat outside on bright days, consistency in the temperature of foods, or soft music throughout the day. The best place to start is with sensory play and observing the child's reactions during the play. Sensory-based activities need to be introduced several times. The first time a child is introduced to paint they may smell the paint and poke the paint with their fingers. The second time the child may explore the paint more and squeeze the paint in their hand. While some children may be initially cautious with paint, others may choose to cover themselves with paint the very first time it's introduced. Other children may instantly put their hands in the air and refuse to touch the paint. This is all helpful information: the reaction the child has with the paint tells us how they are processing the tactile stimuli of paint.

There are many activities that infants, toddlers, and school-aged children participate in throughout the day that support the development of the sensory system. A number of these activities are done through play. When incorporating sensory-based activities in play and daily routines, we foster the development of the sensory system and the development of sensory regulation. It is important that all sensory play and use of sensory modalities be supervised.



Here are some fun and simple ways to incorporate sensory play into a child's day. Many of these activities are typically done in the daily routines of a child. Next time you participate in one of these activities, take a step back and observe the child's interactions and how they respond to the sensory stimuli.

Birth to 12 months

- 1 Swaddling
- 2 Skin to skin contact
- 3 Limit visual sensory stimuli in play; play can include but is not limited to floor time, interacting with a toy, and adult interactions like peek-a-boo
- 4 Establish a naptime and bedtime routine
- 5 Rocking and swaying
- 6 Vocalizing and talking with your newborn
- 7 Listening to music and/or white noise



1-3 Years

- 1 Introduce a lovey or comfort item for sleep and transitions.
- 2 Messy play: Messy play as a toddler is most commonly introduced with exploration of foods during mealtimes. When given mashed or pureed foods while seated in a chair, very young children will explore the foods through touch, smell, and taste. This then expands to messy play with paints, sand, shaving cream, and other tactile modalities.
- 3 Outdoor play: Outdoor play and exploration provides children with multiple forms of sensory input. When outside, children will run, jump, and spin (vestibular system). They will also dig, pick up rocks, and play in mud (tactile). Other activities include smelling flowers (olfactory), climbing (proprioceptive), and listening to birds (auditory). The exposure to sensory play outside is endless.
- 4 Reading a book, listening to stories, listening to music in quiet nook or tent.
- 5 Movement: Movement developmentally begins at birth as an infant. As infants roll, crawl, and walk as a means of mobility, movement-based activities can be built upon. Movement in the home can be expanded to crawling through tunnels or over couch cushions, pushing a push toy or laundry basket, and singing songs with gestures and movement, among countless other possibilities.

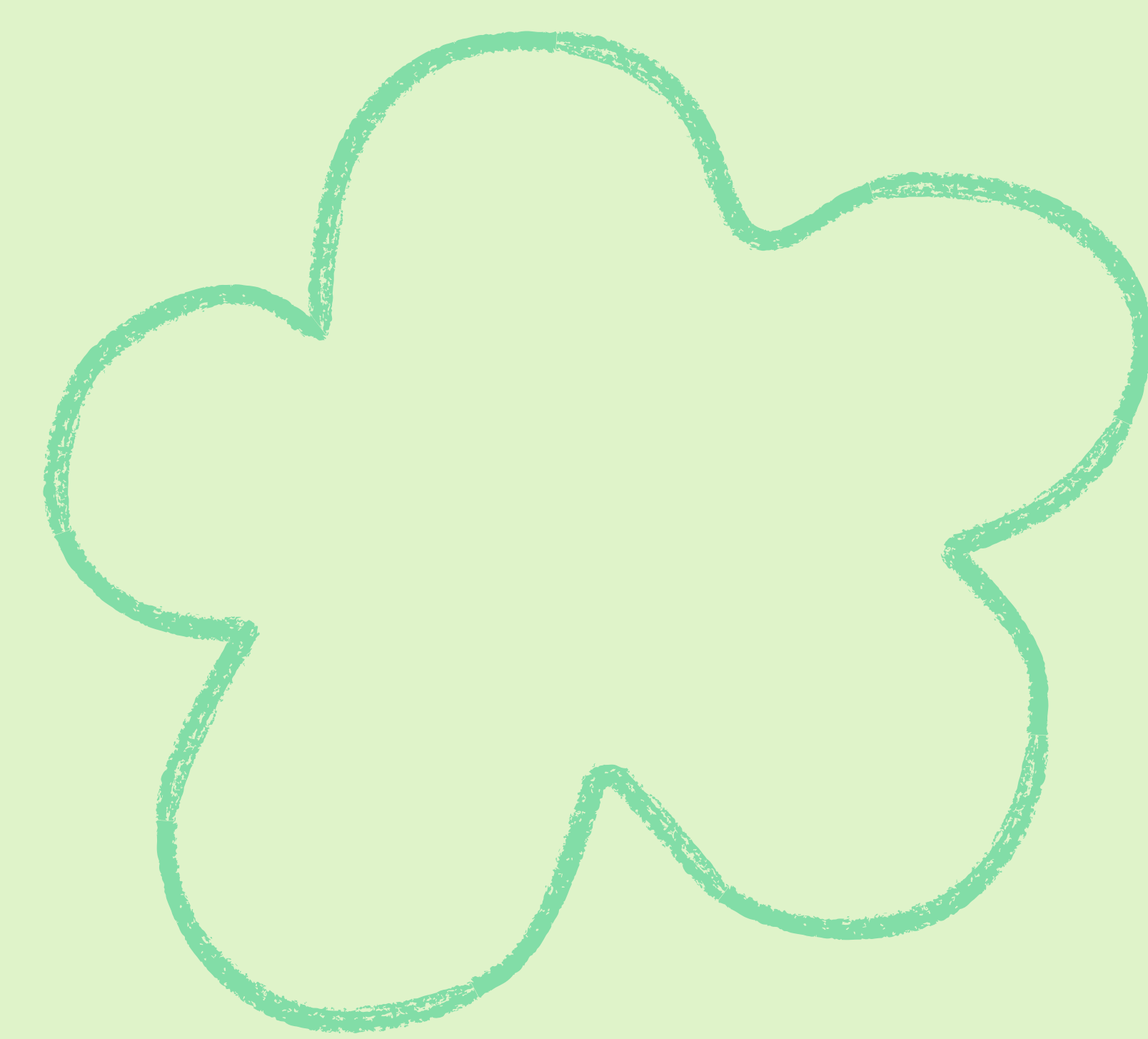


3–10 Years (preschool and elementary school)

- 1 Outdoor play: Expand upon outdoor play that was done previously. Starting at the age of three, outdoor play can be done as individual play or in small groups. Outdoor games, pretend play, and outdoor adventures can all begin closer to the age of three.
- 2 Movement activities: Jumping, skipping, running, hopscotch, and team-based games such as Wiffle ball and kickball.
- 3 Proprioceptive play: Monkey bars, climbing, rock walls, pulling and pushing large objects, carrying water can to water flowers.
- 4 Listening to music or audiobooks/stories.
- 5 Quiet space to write, read, or just relax. This can be a tent, or a fort built out of items found around the house or classroom.
- 6 Messy play: A child is never too old for messy play. As a child grows, messy play will look a little less messy. It may consist of Playdoh, modeling clay, painting, and playing in sand/snow.



Part 3



Observing Children for Sensory Needs



We all react differently to sensory input. The most common ways one reacts to sensory input is as a sensory seeker or a sensory avoider. A sensory seeker is an individual who seeks out sensory input, the more the better. A sensory avoider is an individual who avoids sensory input. The challenge is deciphering which input the child is seeking and which input the child is avoiding. It is not an all or nothing scenario. A child may seek out vestibular movement yet avoid bright lights and loud music. What stimuli a child seeks and avoids is individualized.

Sensory stimuli some individuals seek out

- Long walks or runs (vestibular and proprioceptive input)
- Sitting under a weighted blanket or heavy comforter (deep pressure/proprioceptive)
- Listening to music or sitting in silence (auditory)

Sensory stimuli some individuals avoid

- Messy play with paints, dirt, clay (tactile stimuli)
- Slides and swings (vestibular input)
- Large family gatherings or crowded community events (auditory and visual stimulus)
- Tags on clothes, seams in socks, haircuts (tactile stimuli)



The unique part of sensory processing is that it's different from child to child—there is no recipe or template—so it's crucial not to make assumptions. The first step in understanding a child's sensory system is to observe the child within their natural environment. Observations should be completed in multiple settings. Once observations are complete the results should be reviewed and discussed with a licensed occupational therapist, educational team, and parent/caregiver. Settings to observe a child may include recess, lunch, gym, structured class time, independent work, and group activities.

Here are a few observations to take note of.

Recess

- What type of play is the child participating in (physical, quiet, group play, individual play)?
- Does the child run, jump, and climb easily or do they fall to the ground or bump into others often?
- Can the child stay with one game or activity or do they quickly jump from activity to activity?
- Does the sun, temperature outside, cloud cover, or wind play a factor in how the child participates at recess?
- If there is a disagreement or altercation, will the child seek an adult or either react with words or become physical?
- When coming inside from recess, can the child transition back to class or do they need additional support to calm their body and focus on classwork?



Lunch

- Observe the types of foods a child eats. Do they prefer crunchy snacks, soft foods, or a variety of foods?
- Does the child ever comment about finding scents in the cafeteria offensive?
- If there are no assigned seats, where does the child prefer to sit?
- As the volume of the lunch room increases, does the child's voice become louder or do they become quiet and withdrawn?
- Does the child eat their lunch or just pull it out and minimally eat?
- Does the child safely chew food or tend to stuff their mouth?

Gym

- Is gym a preferred class or non-preferred class?
- Does the location of the gym impact the child's ability to participate?
- Does the child's ability to participate in gym vary depending upon the activity or noise volume?
- When running, is the child able to maneuver safely around obstacles (objects or peers)?
- How does the child transition between activities in gym class and from gym class back to the classroom?
- Developmentally look at the child's ability to complete gross motor developmental milestones, e.g., skipping, jumping jacks, obstacle courses





Structured class time

- Child's ability to maintain attention during a structured class time
- Independent use of classroom materials (pencil, scissors, markers, containers)
- Ability to follow and remember directions; how many times you need to repeat directions
- Child's activity level (high activity level/low activity level)
- Child's ability to stay with the class. Do they move slower than the class or jump ahead of the class?
- Does the child wait to be called on or shout a question and/or answer without raising their hand?
- Frequent trips to the bathroom or nurse during class time

Independent work

- Does the child work cooperatively with peers or prefer to work independently?.
- Ability to follow directions and complete tasks from beginning to end
- How does the child initiate a task? Can they initiate the task independently or do they need reminders and additional support?
- Independent use of classroom materials (pencil, scissors, markers, containers)
- Child's activity level (high activity level/low activity level)



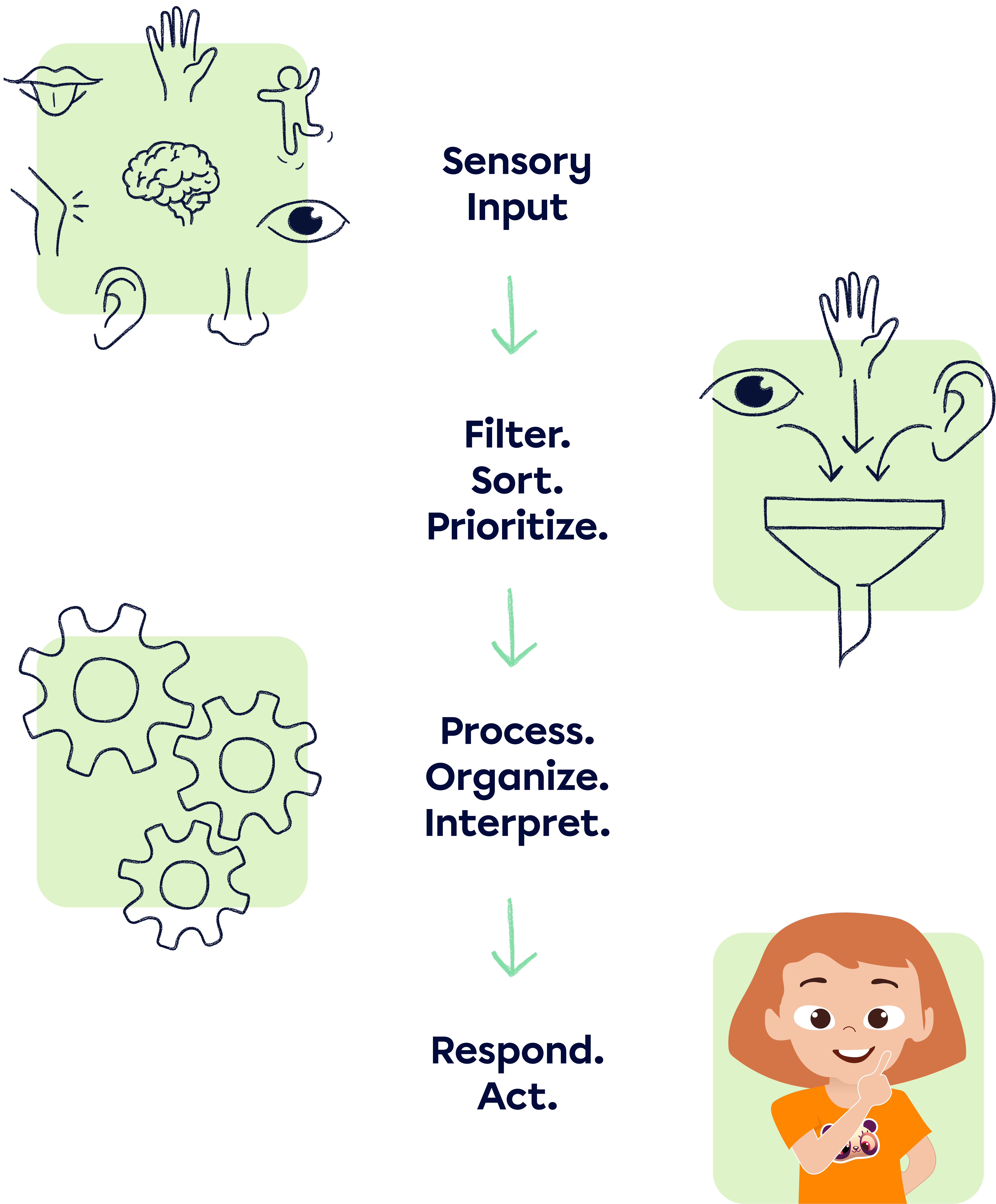


Group Activities

- How does the child respond to other children's ideas? Are they receptive or inflexible?
- Child's ability to follow the directions of an activity from start to finish
- How does the child interact with glue, modeling clay, sand, water, shaving cream, and paints? Are they okay with getting their hands dirty or do they prefer to use a tool such as a paint brush or utensil to touch the modality?

Reference: Ayres, A.J. (1979). Sensory Integration and the Child. Los Angeles: Western Psychological Services.

Sensory Integration



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