Supporting Special Education Inclusion with School Design

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AIA Continuing Education

Learning Objectives:

1. Participants will learn the significance of inclusive design for special education and explain how it positively impacts the overall learning experience and wellbeing of all students.
2. Participants will learn the importance of designing a building holistically and how incorporating inclusive design from the largest site level to the small details benefits special education student safety and cognitive function.
3. Participants will learn how to incorporate inclusive design for special education at the overall site and building level, and understand how it aids in the routines and processes necessary for special education student welfare.
4. Participants will learn how to incorporate inclusive design for special education at the interior building and classroom level, and understand how incorporating flexibility, variety, and sensory transitions into spaces aids in creating a comfortable, healthy, and successful environment for all students and educators.

AGENDA

01 : REFLECTION EXERCISE

02 : INTRODUCTION

03 : SITE & LAYOUT

04 : SPACE DESIGN

REFLECTION EXERCISE

Do you or have you known someone, whether is was a friend, a family member, a peer or even yourself, that had/has a **learning disability**?

Imagine that this individual went to your elementary school… how would you **design** that school differently based on their needs?

INTRODUCTION


NAC
INCLUSIVE DESIGN FOR SPECIAL EDUCATION
BEST PRACTICES FOR LEARNING FACILITIES

Interviewees

Dr. Brian Lowney
Assistant Superintendent of Secondary Schools
Bethel School District, Graham, Washington

Dr. Anna Osipova
Associate Professor, Division of Special Education & Counseling
California State University, Los Angeles

Jamee Zipkoff
Assistant Principal of Special Education
Los Angeles Unified School District

Flint Simonsen
Associate Professor, Special Education and Applied Behavioral Analysis
Whitworth University, Spokane, Washington

References

Gaines, K. S. & Curry, Z. D. (2011). **The Inclusive Classroom: The Effects of Color on Learning and Behavior.** Journal of Family & Consumer Sciences Education, 29(1), 46 - 57.

Mostafa, M., (2008). **An Architecture for Autism: Concepts of Design Intervention for the Autistic User.** Archnet-IJAR, Volume 1 - Issue 1, 189 - 211, DOI: 10.26687/archnet-ijar.v2i1.182, Source: DOAJ

Mostafa, M., (2008). **An Architecture for Autism: Autism aspectss™ in school design.** Archnet-IJAR, Volume 8 - Issue 1, 143 - 158, DOI: 10.26687/archnet-ijar.v8i1.314

What is a Learning Disability

A learning disability is a difference in brain function that affects cognitive processes related to learning

AROUND 15% OF THE US POPULATION, **OR 1 IN 7 INDIVIDUALS**, HAS SOME FORM OF LEARNING DISABILITY.

Salish Sea Elementary

2e students, *twice exceptional,* are students who have a learning disability but also highly gifted in another domain.

3e students = 2e + language barrier

Special Education & Mental Health

Compared to children and students without disabilities, children and students with disabilities experience (Coduti et al., 2016; Fleming et al., 2016; Salle et al., 2018):

- Higher rates of mental health challenges;
- More anxiety, depression, and academic-related distress;
- Higher rates of suicide ideation and suicide attempts, and non-suicidal self-injury; and
- Greater peer victimization

Rates of anxiety and depression (Whitney et al, 2020):

- Down Syndrome 0.2x
- Bullying victimization 2.3x
- ASD 4.4x
- ADHD 5.9x
- Pain 7.0x

Expedition Elementary

SITE & LAYOUT

Site Design:
Drop Off and Entry

- **Spark Curiosity: Interactive Elements**
- **Set the Stage for Learning: Support Space Orientation**
- **Transparency: Create a Sense of Belonging for Students & Parents**


Lake Stevens Early Learning


Hazel Wolf K-8 E-STEM School


Joya Child and Family Dev.


James Baldwin Elementary School

Site Design:
Drop Off and Entry

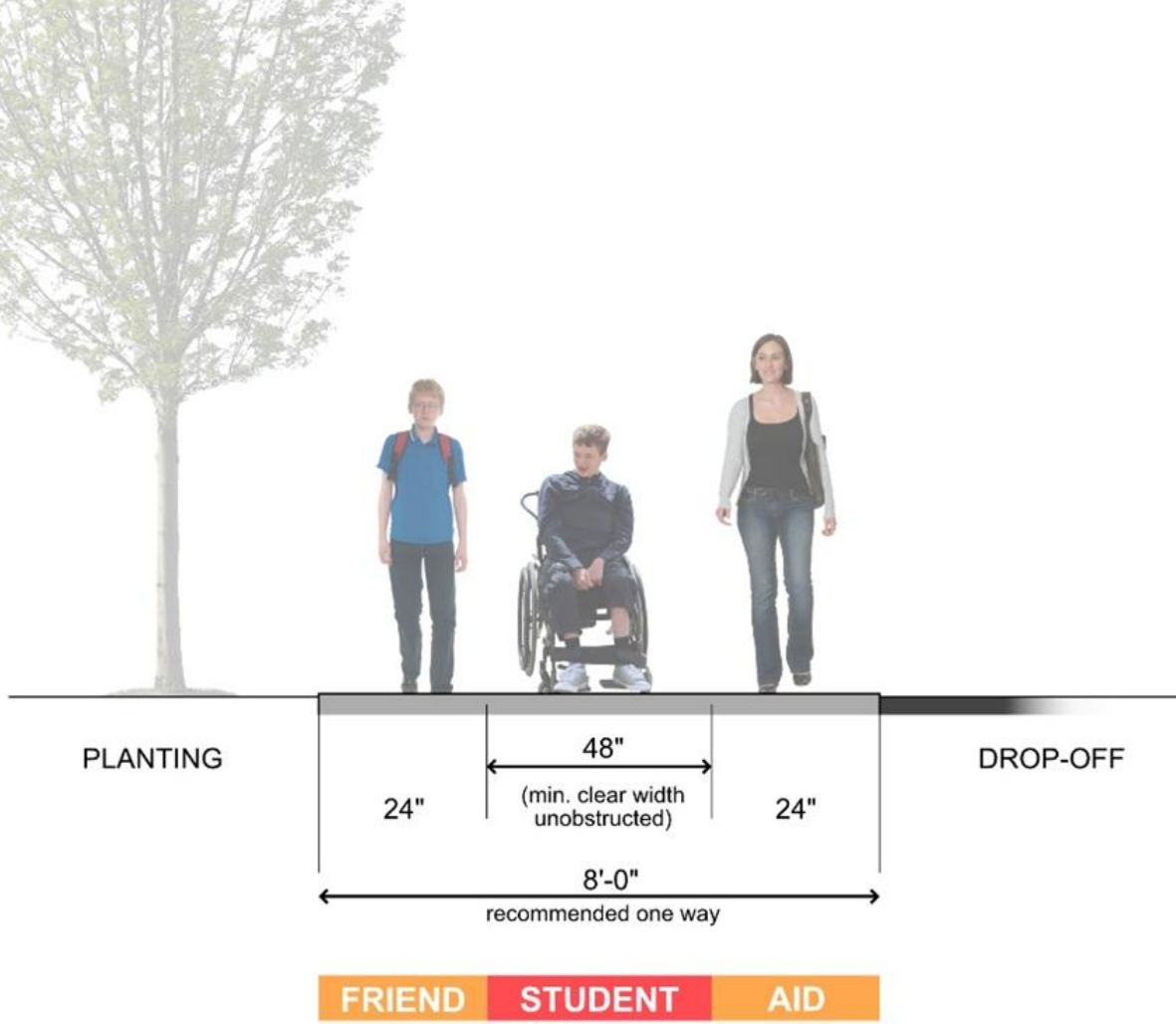
- Covered Drop Off/Pick Up Zones
- Level Paving and Flush Transitions
- Barrier-Free

Wonderful College Prep Academy

Site Design:
Drop Off and Entry

- **Wide Entry Walks to Fit:**
  - Student
  - Friends
  - Para-Educator/Aid

- **Mobility Equipment Turning**
  - Turning diameter for **wheelchairs** was updated from 60" to **67"** in the 2017 A11.7.1.
  - "The minimum diameter for an **electric wheelchair, scooter, or reclining wheelchair user is 94 inches**, while more room is always preferable."*



*https://scootaroundstore.com/en.wheelchair-turning-radius-everything-you-need-to-know

Site Design: Playgrounds

Bennett Elementary School

- **Facilitate Multiple Types of Play and Interaction:**
  - Informal Play
  - Hard-Surface Play
  - Play Structures / Soft-Surface Play
  - Playfields
  - Covered Play

Playa Vista Elementary School

Site Design: Gardens and Transition Space

- **Sensory Gardens**
- **Vocational Gardens**
  - Pair Vocational Gardens and Work Areas
  - Vegetable Gardening
  - Skills Floral Arranging
  - Herb Drying and Packaging
- **Quiet Reflection Areas**
- **Transition Zones**

Site Design: Playgrounds

Joya Child and Family Development

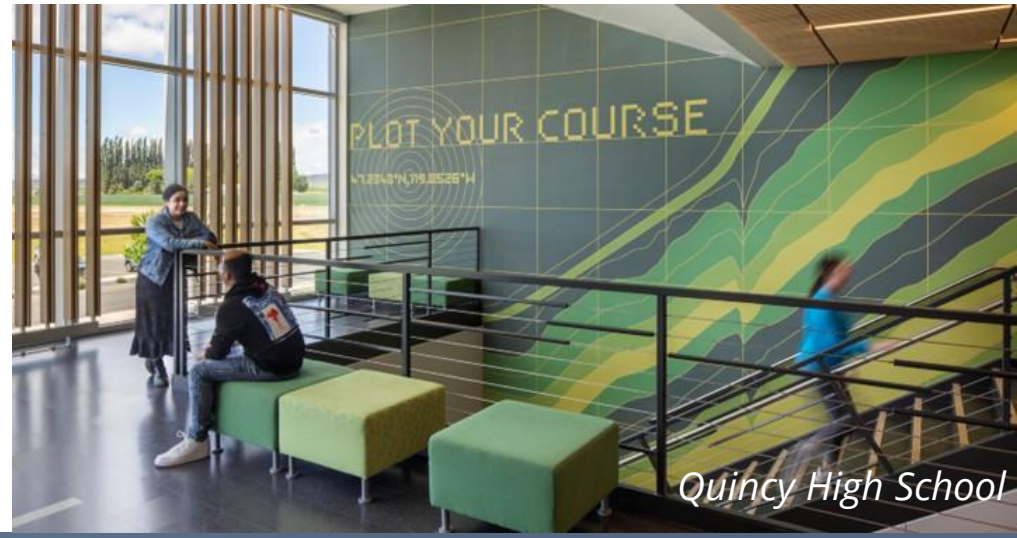
John Campbell Primary School

- **Level Paving and Surface Materials**
- **Gradual Grade Changes**
- **Maintenance**

Site Design: Wayfinding

- **Graphic Imagery & Color in Addition to Written Words for:**
  - Language Processing Disorders
  - Young Students
  - ESL

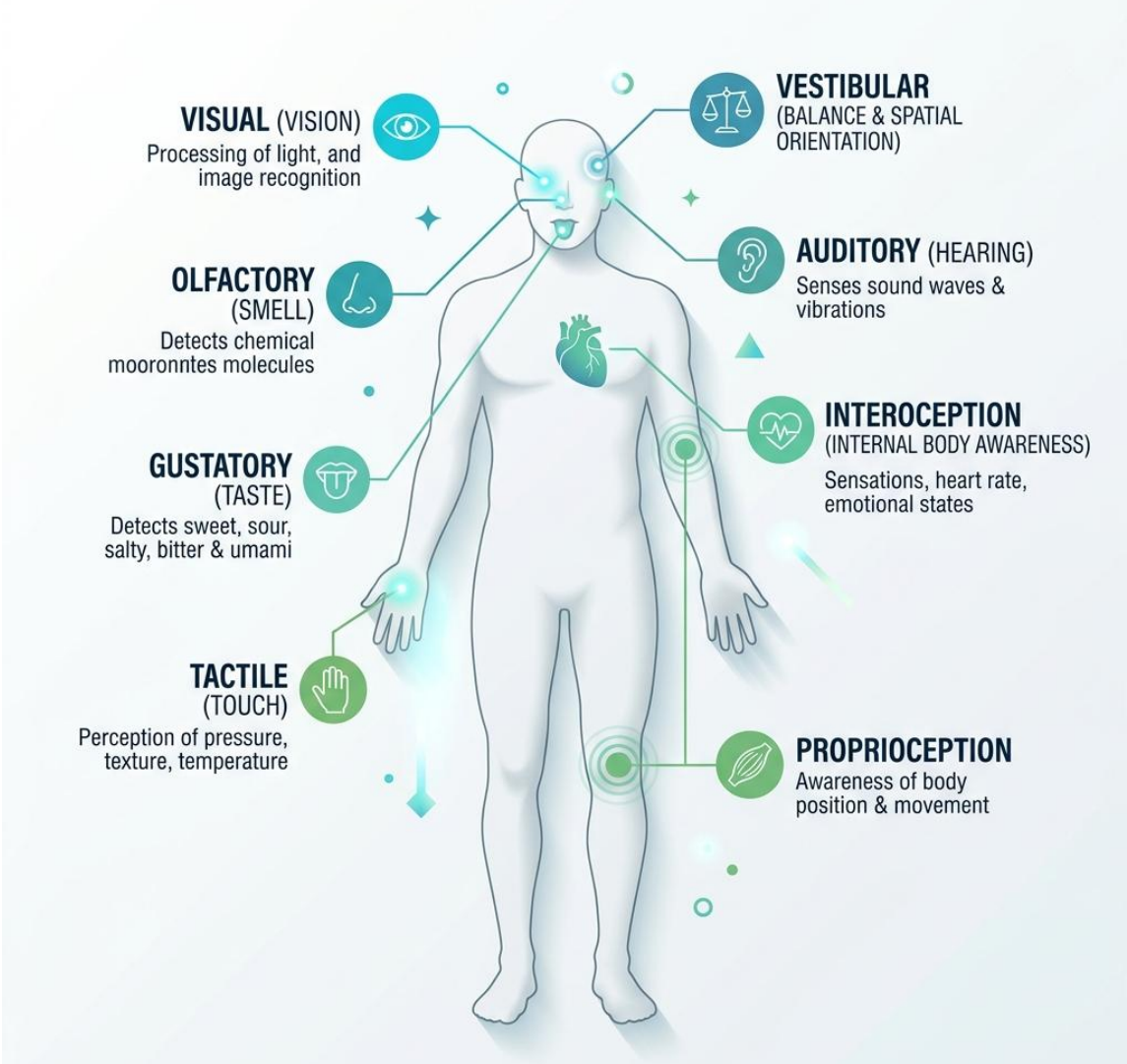
John Adams Middle School



Quincy High School

Human Sensory Systems

Humans use all of their senses to make sense of the world around them, operate within it, and make sense of their own experiences

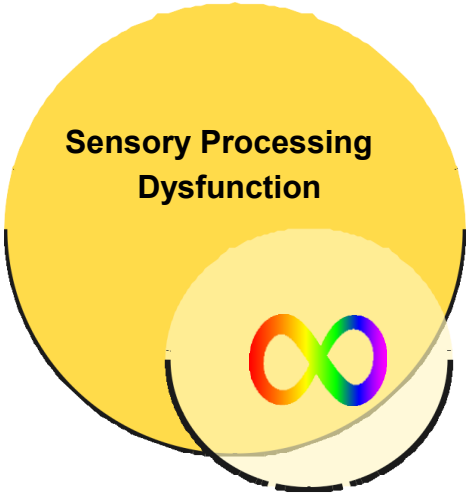


Sensory Integrative Processes

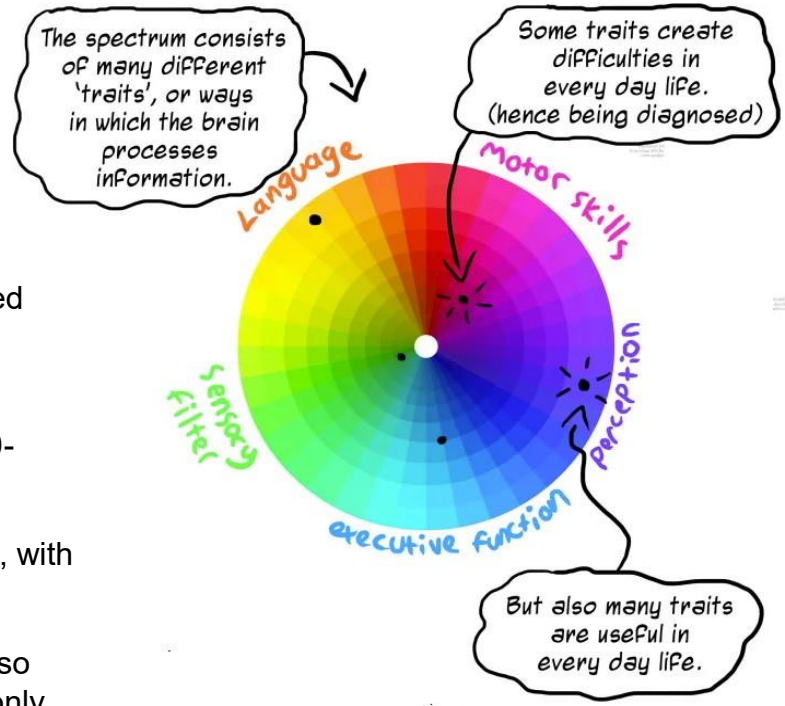
The senses	Integration of their inputs			End Products
Auditory (hearing)			Speech Language	Ability to concentrate Ability to organize Self-esteem Self-control Self-confidence Academic learning ability Capacity for abstract thought and reasoning Specialization of each side of the body and brain
Vestibular (gravity & movement)	Eye movements Posture Balance Muscle tone Gravitational security	Body perception Coordination of two sides of the body Motor planning		
Prociprioceptive (muscles & joints)				
	Sucking Eating	Activity level Attention span Emotional stability	Eye-hand coordination Visual perception	
Tactile (touch)				
	Mother-infant bond Tactile comfort		Purposeful activity	
Visual (seeing)				
	First level	Second level	Third level	Fourth level

References:
Smith Roley, 2015;
Spielmann, 2019

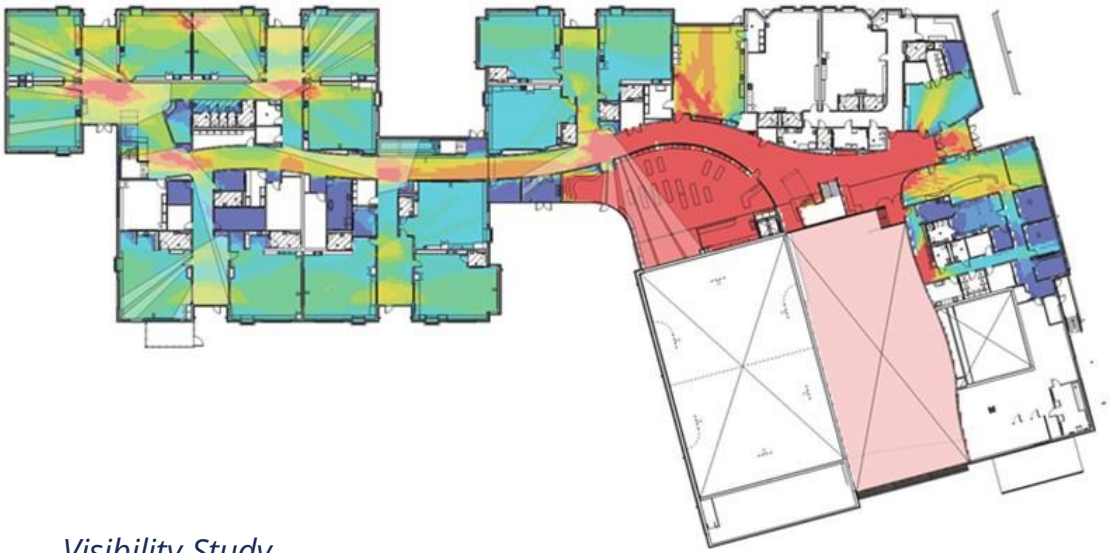
Sensory Processes and Disabilities



- ~14.5% for SPD in children aged 3-12[3]
- ~ 3.2% of school age in the U.S. are diagnosed with Autism Spectrum Disorder (ASD)[1]
- In individuals with autism spectrum disorder (ASD), the prevalence of SPD ranges from 80-90%[3]
- Age of onset is typically before 5 years of age, with 75% of cases diagnosed by 3 years old[3]
- Approximately 80% of individuals with SPD also experience comorbid conditions, most commonly ASD (60-70%), ADHD (40-50%), or anxiety disorders (35-45%)[3]



Building Layout



Visibility Study,
James Baldwin
Elementary School

Locate spaces based on acoustical and stimulatory similarities

High Stimulus Spaces

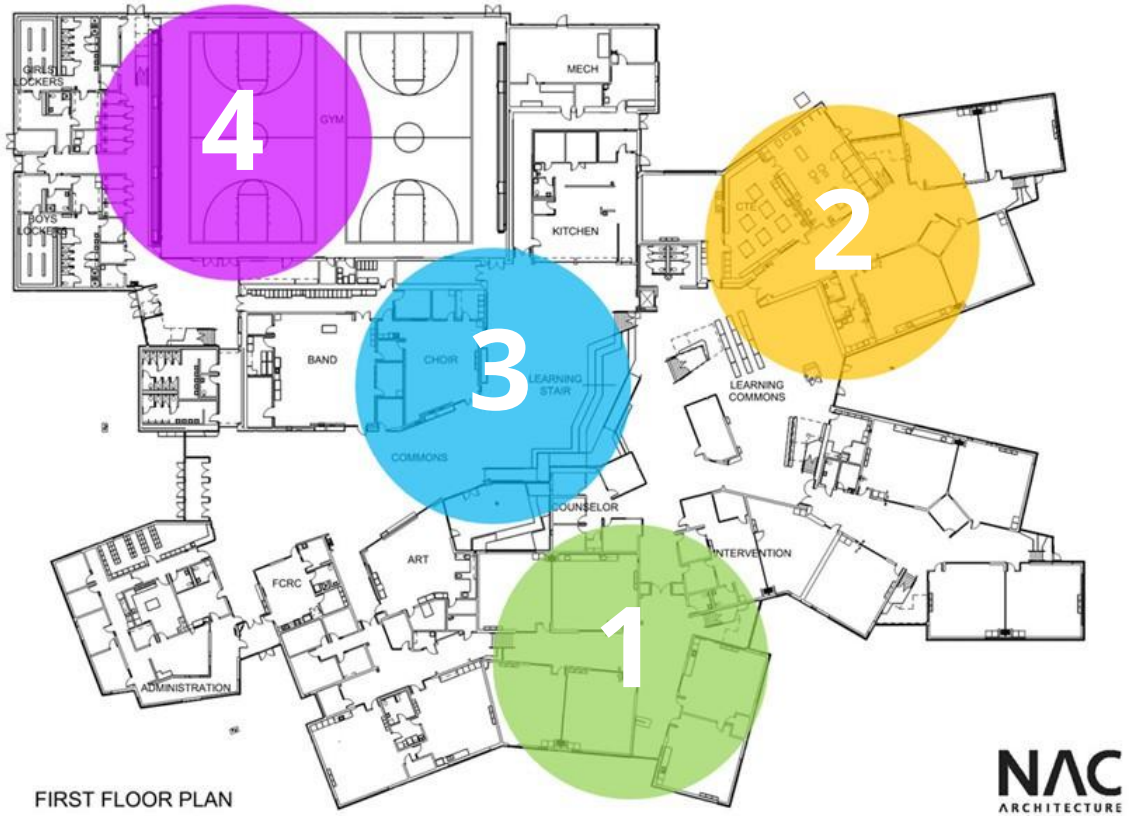
- Gyms, physical activity areas
- Music Rooms
- Commons and Cafeterias
- Entry and Drop Off Zones
- Playgrounds

Low Stimulus Spaces

- Libraries
- Computer Labs
- Speech Therapy
- Administration
- Classrooms

Layout:
Spatial Sequencing

- Routine
- One-Way Circulation
- Age Level or Grade Level



Glover Middle School

SPACE DESIGN

Outdoor Learning Spaces

- **Outdoor Classrooms**
- **Sensory Gardens**
- **Vocational Gardens**

Dr. Owen, C. (2016) Design Across the Spectrum. School of Architecture & Design, University of Tasmania, Australia.

McAllister, K., & Sloan, S. (2016). Designed by the Pupils, for the Pupils: An Autism-Friendly School. British Journal of Special Education.

Silas High School

Hazel Wolf K-8 E-STEM School

Circulation Spaces

- Clear, Calm Flow
- Indirect and Natural Lighting
- Minimize Glare
- Sound Absorption
- Curves
- Transition Zones

Missoula International School

Machias Elementary School

High Traffic Areas

- Wide Enough to Accommodate Large Groups - Min. 10'-0"
- Signage and Graphics to Manage "Traffic"
- Reduce Conflict and Overstimulation
- Rounded Corners

Carl Sandburg Elementary School

Transition Spaces

- Prepare Student for Next Activity Zone or Stimulation
- Recalibrate Student
- Incorporate Nature
- Indirect & Natural Light
- Acoustic Treatment

La Center Middle School

Riverview Elementary School

Classrooms: Layout

- **Transparency**
  - **Sense of Belonging**
  - **Connection**
- **Entries Opposite Teaching Wall**

Classrooms: Layout

- Zones for Flexibility
- Variety of Furniture
- Sensory Zones & Reflection Spaces
- Multiple Teaching Walls
- Classroom Shape

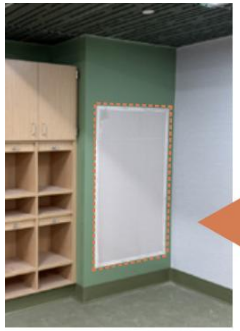
Stevens Creek Elementary School

Happy Valley Elementary School

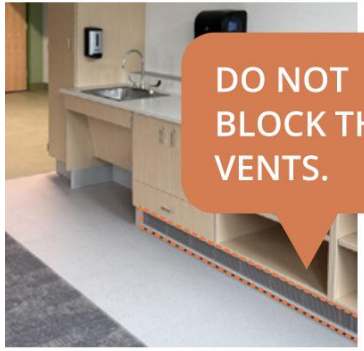
Classrooms: Multiple Instructors

- **Instructor & Para-Instructor**
- **Storage**
  - **Equipment Storage**
  - **Instructor Storage**

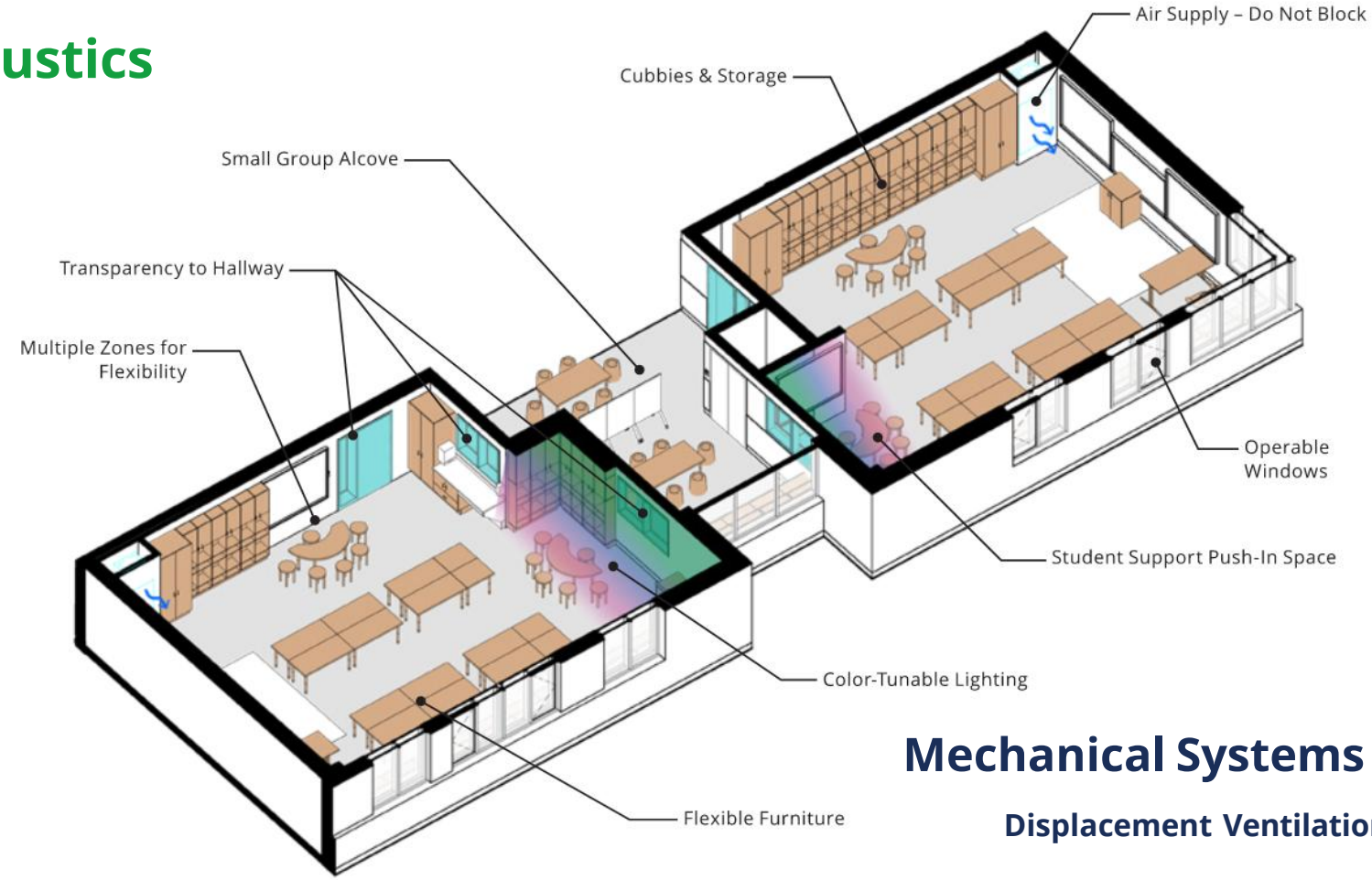
Classrooms: Acoustics



Ventilation grille: Provides ventilation air to your classroom.



Heaters: Heat is supplied to your classroom using a system called finned tube heat exchangers located behind casework. There are vents located in the toe kick space, and at the back of the counter.



Crescent Harbor Elementary School

Mechanical Systems

Displacement Ventilation

Spatial Adjacencies

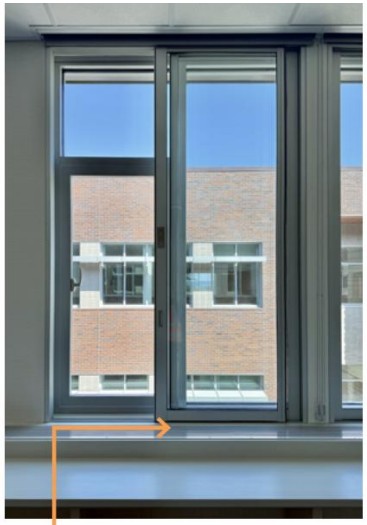
Classrooms: Acoustics

Site Background Noise

Wall Construction

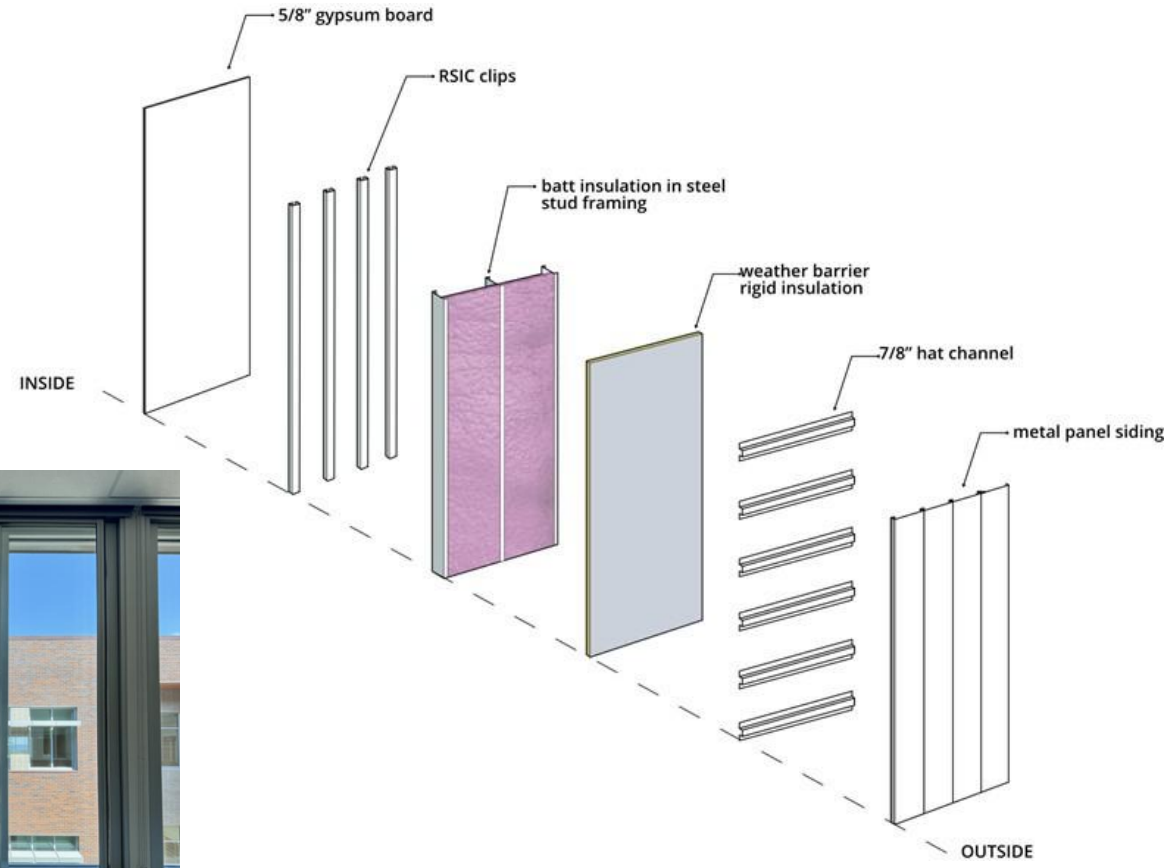
Windows

When both windows are closed, exterior sound is blocked

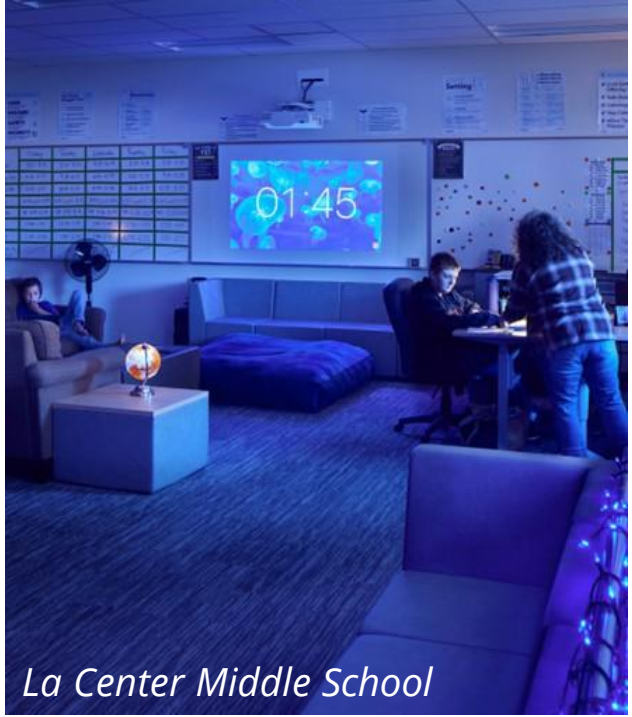


Slide sound barrier window open to access exterior operable window

Open exterior window to allow fresh outdoor air




Cherry Crest Elementary School



La Center Middle School


Venice High School

Classrooms:
Lighting & Daylighting

- Indirect & Soft Overhead Lighting
- Natural Light
- Shades/Glare Reduction
- Daylight Indicators/Routine
- RGBW Lighting

Dessie Evans Elementary School

Summit Atlas High School

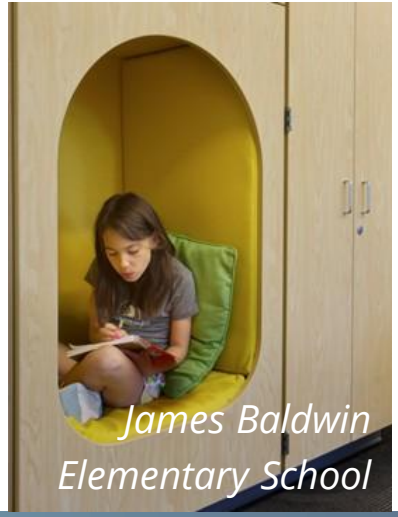
Classrooms:
Color & Visual Aid Placement

- **Visual Aid Placement Behind Students**
- **Accent Color for Focus on Side Wall**
- **Color Theory: Neutrals & Greens**


Mount Si High School


Stevens Creek Elementary School


Wing Luke Elementary School


James Baldwin Elementary School

Breakout Spaces & Escape Spaces

- **Support Classroom Functions**
- **Sensory Input, Focus**
- **Separate Spaces**
- **Visible from Classroom**

Sensory Spaces

- Improved Focus and Concentration
- Promotes self-regulation
- Development of social emotional skills
- Improved fine and gross motor skills
- Neurodivergent and neurotypical inclusion and exploration

Multi-Sensory Spaces

New Bethel High School

Open Spaces: Variety

- Variety of Furniture Types
- Zones, Scale and Capacity
- Sensory Zones
- Acoustic Treatment

Open Spaces: Ventilation & Sensory Input

- **Ventilation to Reduce/Isolate Unwanted Smell**
  - Mechanical Separation
  - Physical Separation
  - Building Layout

Tillicum Middle School

Open Spaces: Variety

- **Variety of Activities in Gyms based on Sensory Input**

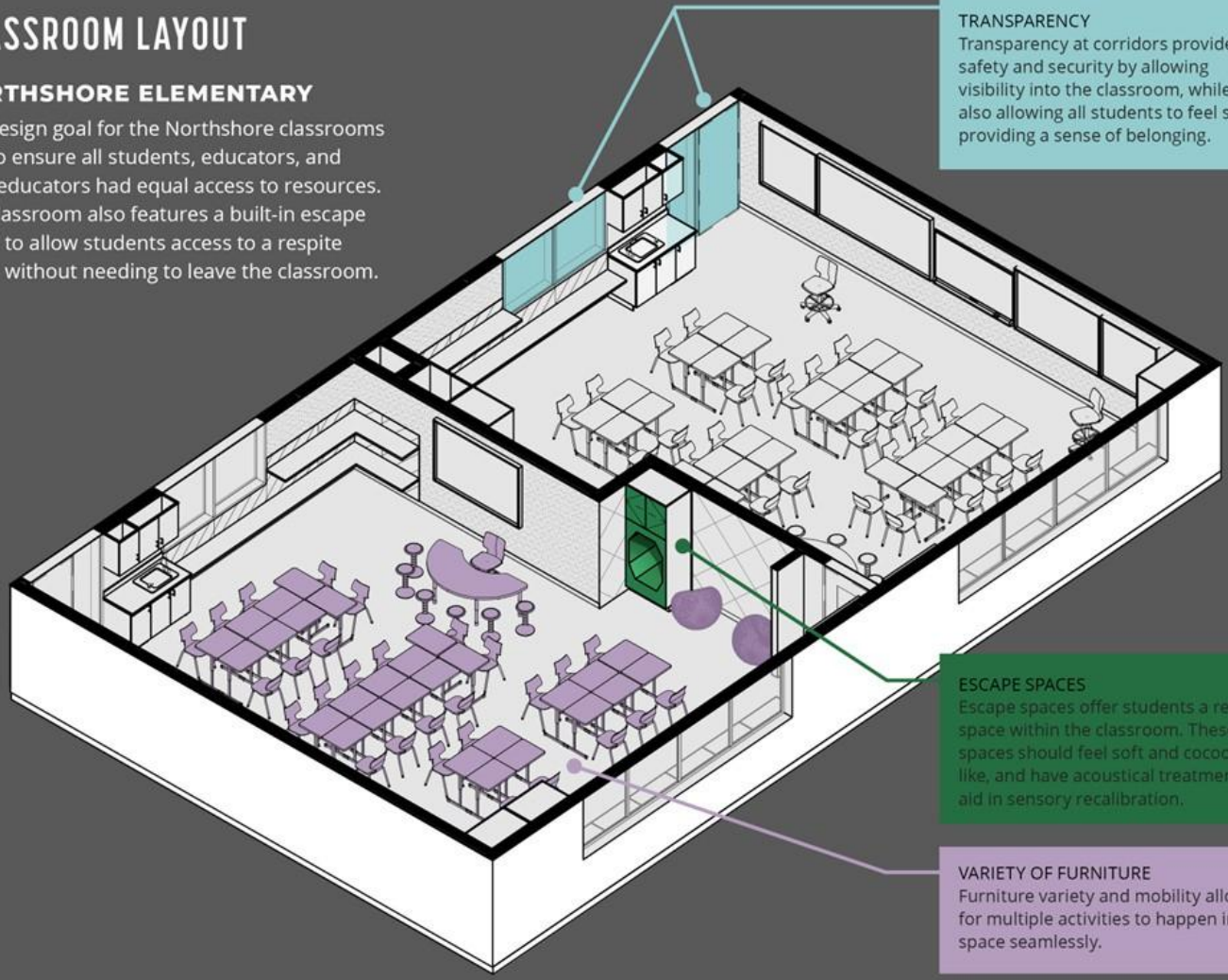

Hamlin Robinson Middle School


Black Diamond Elementary School

CLASSROOM LAYOUT

NORTHSHORE ELEMENTARY

The design goal for the Northshore classrooms was to ensure all students, educators, and para-educators had equal access to resources. The classroom also features a built-in escape space to allow students access to a respite space without needing to leave the classroom.



TRANSPARENCY
Transparency at corridors provides safety and security by allowing visibility into the classroom, while also allowing all students to feel seen, providing a sense of belonging.

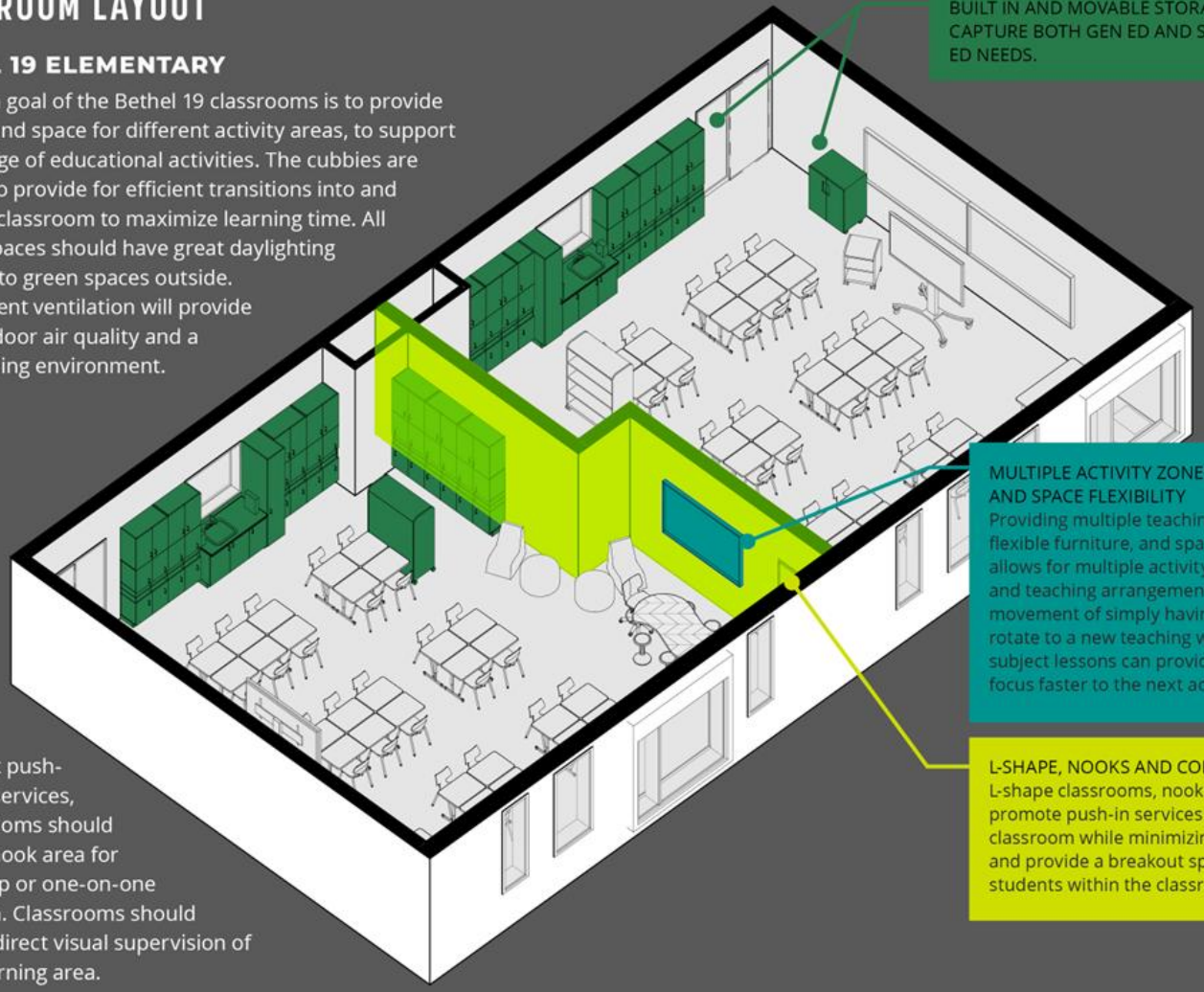
ESCAPE SPACES
Escape spaces offer students a respite space within the classroom. These spaces should feel soft and cocoon-like, and have acoustical treatment to aid in sensory recalibration.

VARIETY OF FURNITURE
Furniture variety and mobility allows for multiple activities to happen in a space seamlessly.

CLASSROOM LAYOUT

BETHEL 19 ELEMENTARY

The design goal of the Bethel 19 classrooms is to provide flexibility and space for different activity areas, to support a wide range of educational activities. The cubbies are intended to provide for efficient transitions into and out of the classroom to maximize learning time. All learning spaces should have great daylighting and views to green spaces outside. Displacement ventilation will provide healthy indoor air quality and a quiet learning environment.



BUILT IN AND MOVABLE STORAGE TO CAPTURE BOTH GEN ED AND SPECIAL ED NEEDS.

MULTIPLE ACTIVITY ZONES AND SPACE FLEXIBILITY
Providing multiple teaching walls, flexible furniture, and space flexibility allows for multiple activity zones and teaching arrangements. The movement of simply having students rotate to a new teaching wall between subject lessons can provide renewed focus faster to the next activity.

L-SHAPE, NOOKS AND CORNERS
L-shape classrooms, nooks and corners promote push-in services in the classroom while minimizing disruption, and provide a breakout space for students within the classroom.

To support push-in special services, the classrooms should include a nook area for small group or one-on-one instruction. Classrooms should also have direct visual supervision of shared learning area.

QUESTIONS & DISCUSSION


NAC
ARCHITECTURE
DESIGNING FOR
SPECIAL EDUCATION
BEST PRACTICES FOR SPECIAL NEEDS LEARNING FACILITIES


NAC
INCLUSIVE DESIGN FOR
SPECIAL EDUCATION
BEST PRACTICES FOR LEARNING FACILITIES

THANK YOU
FOR ATTENDING

NAC

Appendix A: Phase 2 Intervention Outcomes

Acoustical Modification Test (outcomes):

- Acoustics are the most influential architectural factor on autistic behavior
- 64% of teachers and 79.3% of parents rank acoustics, as the most influential architectural factor on autistic behavior.
- **Attention span**: Acoustic intervention exhibited a gradual increase in their attention span median from 44 to 58 to 72 to 142.50 seconds over the 12 week period - Better able to identify, recognize, imitate and verbalize in the soundproofed speech room
- **Response time:** study group illustrated a gradual decrease in their response times, indicating a positive result. Their median response times decreased from 25.50 to 16 to 10.50 to 7.00 seconds through weeks 0, 4, 8 and 12 respectively.
- **Behavioral Temperament**: median occurrence of self-stimulatory behavior in the study group decreasing from 2.5 to 1 occurrence, compared to a stable median of 2 occurrences in the control group, pre and post intervention at weeks 0 and 124

Spatial Sequence Intervention (outcomes):

- 20% of teachers and 13.79% of parents rank spatial sequencing as the most influential architectural factor on autistic behavior
- **Attention span:** a general pattern of improvement was observed. The median attention span dipped at first and then gradually increased from 13.5 to 12.5 to 22 to 30 seconds from week 0 through 12.
- **Response time:** The study group exhibited a decrease, i.e. improvement, in median response time from 11 to 8.5 to 6.5 to 3.5 seconds during week 0, 4, 8 and 12 respectively.
- **Behavioral Temperament:** study group was seen to improve, although not as significantly as the other indicators. The median occurrence of self-stimulatory behavior in the study group decreased from 1.5 to 0.5 occurrences, with a mean of 2.83

(Mostafa, 2008, pp 198-200)

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Appendix B: Escape Space Anecdote

“One of the very first observations made early on in the test was the effect of the “escape space” upon the behavior of the children, particularly the hyperactive and severely autistic ones. Prior to the modifications, one such child with complex auditory, tactile and proprioceptive issues, was constantly removing herself from the group to sit on the floor against a wall with legs stretched in front, banging her head against them. This would usually last for about 10 minutes, after which she would sit quietly alone for a few minutes and then rejoin the group. The child was apparently escaping the maladjusted sensory stimulation of the session at hand and re-calibrating her inner sensory mechanism. She first removed herself from the situation and then provided herself with the sensory input required: auditory reduction by distancing herself, tactile by inflicting pain, and proprioceptive through the rhythmic movement and physical boundary of the wall.

Once an escape space was made available, where no other activity was conducted, both teachers and the researcher expected this child to spend the majority of her time within it. At the very beginning, that was the case, but eventually the child used the space less and less. It was observed, however that she constantly looked over her shoulder, checking to make sure it was still available. She became slightly more focused, if anything only because of the diminished number of “escapes”. It was almost as if the mere presence of the option to escape was sufficient, and her need to escape decreased, now that she was comfortable with the fact that there was constancy in that escape opportunity.”

(Mostafa, 2008, p. 201)

Additional Presentation References

1. Barto, A. (n.d.). *The State of Learning Disabilities Today – Learning Disabilities Association of America*. Retrieved October 26, 2025, from https://ldaamerica.org/lda_today/the-state-of-learning-disabilities-today/
2. Burgess, R. (2022, March 30). Understanding the spectrum – a comic strip explanation. *The Art of Autism*. https://the-art-of-autism.com/understanding-the-spectrum-a-comic-strip-explanation/
3. CDC. (2025, May 27). *Data and Statistics on Autism Spectrum Disorder*. Autism Spectrum Disorder (ASD). https://www.cdc.gov/autism/data-research/index.html
4. Mostafa, M. (2008). An Architecture for Autism: Concepts of Design Intervention for the Autistic User. *Archnet-IJAR : International Journal of Architectural Research*, *2*. https://doi.org/10.26687/archnet-ijar.v2i1.182
5. Nicole. (2019, November 26). Sensory Processing and Autism. *Autism Research Institute*. https://autism.org/sensory-processing-and-asd/
6. Novak, G. (n.d.). *Sensory Processing Disorder Statistics: Market Data Report 2026*. Retrieved April 22, 2026, from https://worldmetrics.org/sensory-processing-disorder-statistics/
7. Whitney, D. G., Shapiro, D. N., Peterson, M. D., & Warschausky, S. A. (2019). Factors associated with depression and anxiety in children with intellectual disabilities. *Journal of Intellectual Disability Research : JIDR*, *63*(5), 408–417. https://doi.org/10.1111/jir.12583