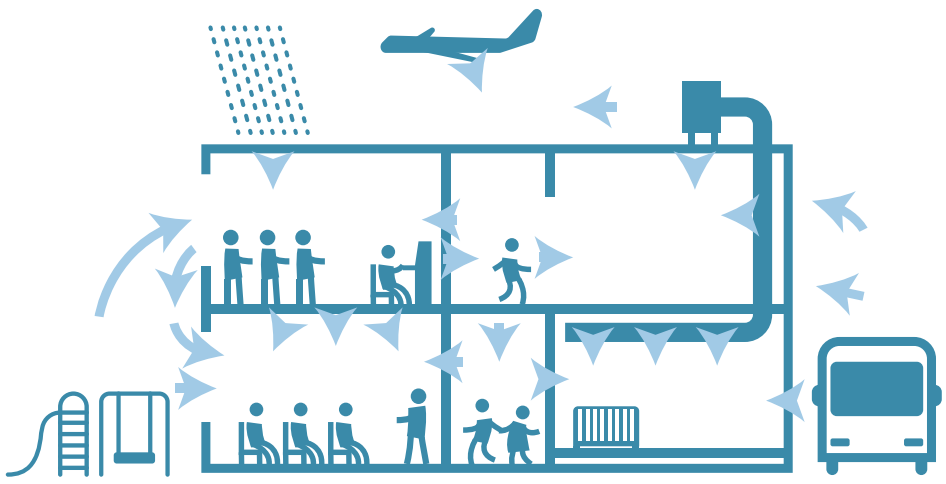
THE IMPORTANCE OF GOOD CLASSROOM ACOUSTICS

As we build new schools and renovate old ones, there are numerous factors that must be considered in order to optimize the learning outcomes for ALL students.

The invisible presence of noise and excessive reverberation cannot be ignored. School acoustical performance has a direct effect on speech intelligibility and therefore the ability for students to learn. Administrators, educators, and architects must remain aware of the noise levels surrounding their students.



WHAT CAUSES NOISE IN THE CLASSROOM?

• HVAC units • Plumbing • Noise generated by students
• Electronic equipment • External classroom noise
• Outdoor noise • Lighting • Classroom pets

HVAC Units are the primary cause of noise issues in the classroom.

When choosing a new HVAC unit or treating an existing unit, it's important to consider how HVAC noise contributes to poor classroom acoustics.

ANSI/ASA S12.60-2010

These are the accepted standards for classroom acoustics outlined by the American National Standards Institute and the Acoustical Society of America.

	NOISE LEVEL	REVERBERATION TIME
<10,000 cu ft	35 dBA	.6 seconds
>10,000 cu ft	35 dBA	.7 seconds
Relocatable Classroom	35 dBA	.5 seconds

*Classrooms should be built to be adaptable to a .3 second reverberation time

PROPERTIES OF CLASSROOM ACOUSTICS

NOISE
Any sound that interferes with what an individual wants/needs to hear. Noise levels should be kept as low as possible.

SIGNAL-TO-NOISE RATIO
The relationship of the intensity of the desired auditory signal and the background noise level. This should be positive, like +15 dB. The signal is 15-dB louder than the noise.

REVERBERATION
The repeated reflection of sounds off of surfaces in an enclosed space. Reverberation should be kept low (short reverberation times) by using high-quality sound absorbing materials on ceilings and walls.

CRITICAL DISTANCE
The distance from a sound source where the direct sound and reverberant sound are equivalent. Within this critical distance the echoes from the walls don't affect understanding.

WHO IS MOST SUSCEPTIBLE?

Poor classroom acoustics certainly affect ALL students, however there are individual students who are at higher risk for learning difficulties as a result of excessive noise.

- Students with any permanent or fluctuating hearing loss. Ear infections are particularly common in young children
- Younger students
- Children with auditory processing disorders
- Children with learning disabilities and developmental delays
- Children with articulation and language disorders
- Children with attention deficits
- Second language learners

WHO TO CONTACT?

Your School District's **educational audiologist** is an excellent resource when looking for more information on classroom acoustics. These Professionals are able to comment specifically on acoustical conditions in the schools within your district. You can find the names and contact information for your educational audiologist on the Minnesota Academy of Audiology's webpage under the tab titled "Find an Audiologist."

SOURCES

ANSI/ASA S12.60-2010 American National Standard Acoustical Performance Criteria, Design Requirements and Guidelines for Schools (Part 1; Permanent Schools and Part 2; Relocatable Classrooms)

Educational Audiology Handbook (3rd Edition)

MINNESOTA COMMISSION OF THE DEAF, DEAFBLIND & HARD OF HEARING