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.

Children learn in the classroom primarily through hearing the spoken language of their teachers and peers. They can hear clearly, however, only if the room has good acoustics. Classroom acoustics involve background noise and reverberation, the reflection of sounds within a room. Reductions in classroom noise and reverberation significantly benefit students, especially those with hearing and listening problems. Required limits on noise and reverberation which support classroom learning are provided in standards such as ANSI/ASA S12.60.

Classroom Causes of Noise: HVAC units • Electronic equipment • External classroom noise • Outside noise • Lighting • Classroom pets • Plumbing • Noise generated by students

Classroom Causes of Reverberation: Sounds reflecting off primarily large, flat, hard surfaces such as a sheet-rocked walls and ceilings

Note: 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 required by the American National Standards Institute and the Acoustical Society of America.

<table>
<thead>
<tr>
<th></th>
<th>NOISE LEVEL</th>
<th>REVERBERATION TIME</th>
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</thead>
<tbody>
<tr>
<td>≤10,000 cu ft</td>
<td>35 dBA</td>
<td>.6 seconds*</td>
</tr>
<tr>
<td>&gt;10,000 cu ft</td>
<td>35 dBA</td>
<td>.7 seconds</td>
</tr>
<tr>
<td>Relocatable Classroom</td>
<td>35 dBA</td>
<td>.5 seconds</td>
</tr>
</tbody>
</table>

*Classrooms should be built to be adaptable to a .3 second reverberation time for children with hearing problems or other special listening needs

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 seeking more information on classroom acoustics. These professionals are able to comment specifically on acoustical conditions in the schools. You may also contact your state’s chapter of the American Academy of Audiology, American Speech Language Hearing Association, or the Educational Audiology Association at www.edaud.org.