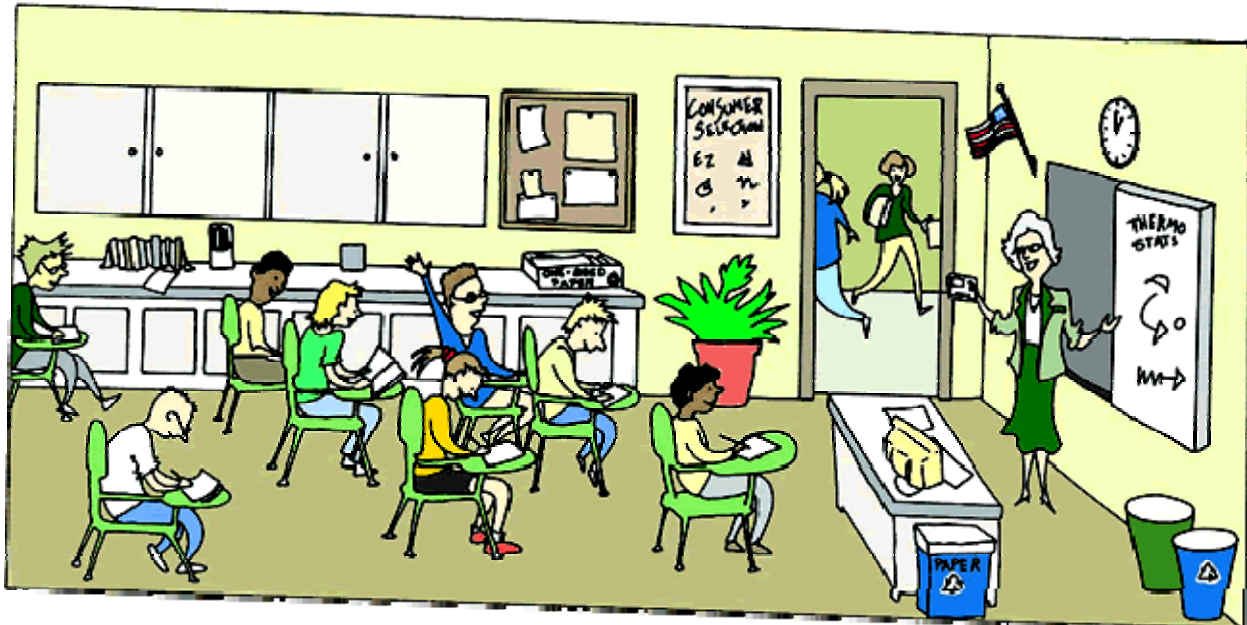


You are to design an original **multi-purpose classroom** within a high school in a northeast suburban environment. The classroom must make use of modern state-of-the-art technology. You may NOT use an existing building. The primary focus of the design is the **acoustics of the space**.



Classroom Program Requirements:

1. Primary occupancy of the classroom is traditional teaching. Assume the classroom is located along a corridor on the 2nd floor of a 3-story high school building with classrooms directly below & above it, as well as classrooms adjacent to it on both ends.
2. Secondary occupancy is for the purpose of musical instrument instruction including such instruments as (but not limited to) percussion, piano, stringed instruments, brass instruments, woodwind instruments. Assume students and instruments are in small informal “clusters” randomly scattered around the classroom.
3. Provide appropriate seating for **exactly 35 high school children**. Must have operable exterior windows accounting for a minimum of 8% of the floor area. Must be acoustically well designed to allow for **excellent sound quality** for a variety of activities, in addition to **noise control**. Keep background noise and sound attenuation from external sources to a minimum (within reasonable standards). Also, keep any noise generated from **INSIDE** the classroom from attenuating to the other spaces of the school building.
4. Assume the construction of the building (i.e., exterior & interior walls of the building, floors & ceilings, structural system, etc.) can be of any construction materials permitted for the occupancy as per IBC. Document your research. The building may NOT be of Type V construction as per IBC.

Submittals:

1. **Presentational Overall 3D Perspective Views** – provide at least 3 different 3D perspective interior views of the furnished classroom, preferably in SketchUp, plotted in color printed in perspective to fill 11”x17” sheets. Print a minimum of one view of the classroom used for traditional teaching, and one view of the classroom as used for musical instrument instruction. Provide labels to acoustical features, as well as overall height, length and width dimensions.
2. **Floor Plan (drawn in AutoCAD)** – show architectural & acoustical floor plan design plotted to $\frac{1}{4}$ ” = 1’-0” scale. Indicate all room dimensions. Show all 35 seats and other furnishings assuming traditional classroom setup. Clearly indicate and label ALL special acoustical features including noise control strategies.
3. **Fully-detailed “Wall Section” (drawn in AutoCAD)** – show detailed vertical exterior wall section (plotted at a scale of $\frac{1}{2}$ ” = 1’-0”) indicating and labeling all construction materials and acoustic features including noise control strategies. The wall section must cut through the exterior wall – through the width of classroom – through the corridor wall. Provide all vertical and horizontal dimensions.
4. **Written Narrative** – Provide a bound written description of the space with considerable attention to all applicable qualities of good acoustical design, and noise control probably at least 5 – 7 pages in length. Be sure to discuss the following:
 - a. List and describe **design criteria**. For example, massing of spaces, functions, movement patterns, noise control, and specific IBC Code criteria as it relates to the design of the space.
 - b. List and describe construction assemblages of the **exterior wall**. In particular, describe the criteria, materials, STC, and other factors affecting the design of the walls as it pertains to acoustics.
 - c. List and describe construction assemblages of the **interior corridor wall**. In particular, describe the criteria, materials, STC, and other factors affecting the design of the wall as it pertains to acoustics.
 - d. List and describe construction assemblages of the **floor and ceiling**. In particular, describe the criteria, materials, STC, IIC, and other factors affecting the design of the floor & ceiling as it pertains to acoustics.
 - e. List and describe the specifics of the **sound reinforcement system** to be used in the classroom.
 - f. Using hand calculation, determine the **reverberation time** (in units of seconds) in the classroom assuming the 35-seat traditional teaching setup. Be sure to show ALL WORK, list and substantiate all criteria.