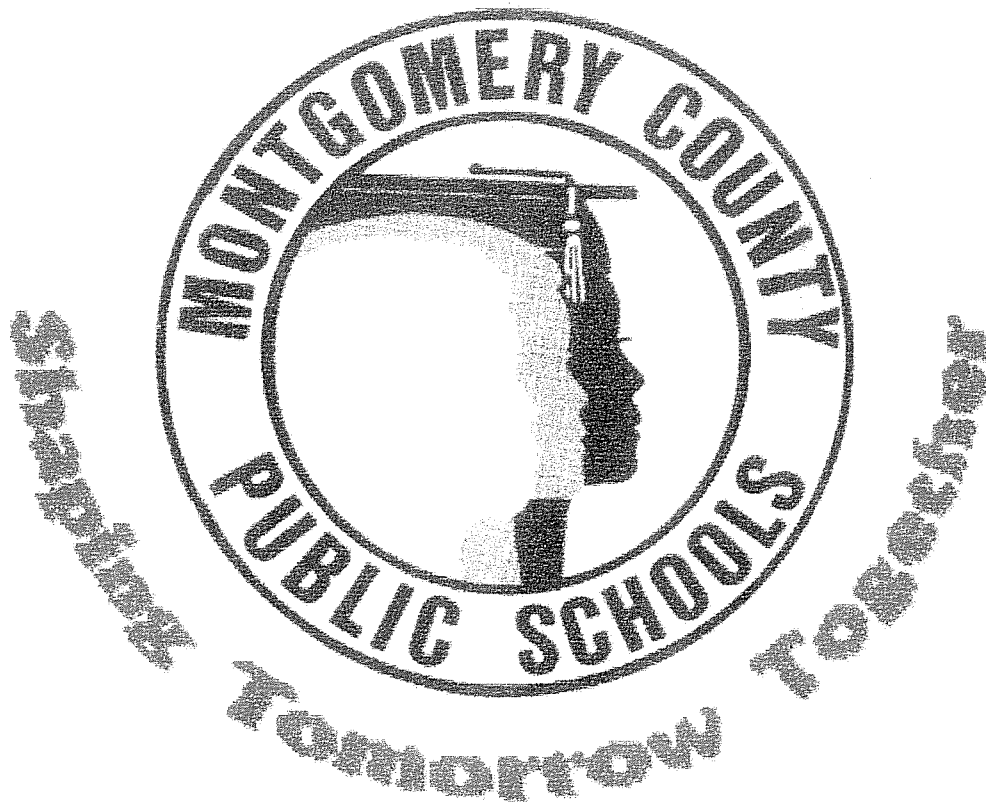


*Elementary, Middle & High School  
Space Requirement Standards & Capacity  
Size Standards*

*Adopted by  
Montgomery County Public Schools  
Board of Education  
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# Introduction

The purpose of this document is to provide suggested program space standards and capacity criteria for Montgomery County Public Schools.

These standards take into consideration current programs and services, draft guidelines developed by the Virginia Department of Education, recommendations from the Council of Educational Facility Planners, International [CEFPI], and information derived from various states and non-profit organizations.

The standards established for Montgomery County Public Schools must meet the student and programmatic needs that exist. These standards should be used as a guide for planning, designing, and evaluating school facilities. These standards should also be used in helping understand future renovations, additions, and new construction that may be needed.

# **Montgomery County Public Schools**

## **Elementary Schools**

Suggested Space Requirement Standards  
and  
Capacity Size Standards

***Adopted  
February 8, 2000***

DeJong & Associates, Inc.

# Elementary School Standards

The attached standards are based on an elementary school with the following criteria:

<b>Grade Configuration:</b>	K-5; or K-2, 3-5
<b>School Size:</b>	Preferred; 350-600 students
<b>Student/Classroom Ratio:</b>	20/1
<b>Site Size:</b>	Minimum 10 Useable Acres Plus 1 Acre Per100 Students

# Elementary School Size

As Montgomery County Public Schools develops a long-range facility plan, the optimum size of schools will be important to determine.

Research on this topic often associates small with rural schools and large with urban schools. This is not always the case. Furthermore, there are a wide variety of definitions of what is small and what is large. In a combined rural and suburban area, such as Montgomery County, an elementary school of 600 students may be classified as a large school. In San Diego, or some communities in Florida or Texas, a 600-student elementary school would be defined as small.

This issue is further compounded in Montgomery County since the county includes more rural areas and other areas that would be classified as more urban/suburban.

Even though there is a great amount of debate on this topic, in general, research would indicate the following:

<u>Variable</u>	<u>Favor Large or Small School</u>
<b>Academic Achievement</b> [Several recent studies favor small schools, especially for low SES students.]	Smaller Schools
<b>Parent Involvement</b> [PTA, volunteers, tutoring, fund-raising, etc.]	Smaller Schools
<b>Educational Opportunities</b> [choice, more diverse program offerings]	Larger Schools
<b>Cost Effectiveness</b> [more students to average overhead costs, e.g. media specialists, principals, secretaries, food service, athletics, etc.]	Larger Schools
<b>Discipline</b> [greater sense of belonging, easier to "control"]	Smaller Schools

Schools built years ago were built small to begin with. The addition of kindergarten, smaller class sizes, media centers, special education, art, music, computer labs, Title/Chapter I, as well as other special services, required the conversion of space that was for regular classrooms to be used for these special services. A school that could once accommodate 500 students today might only be able to accommodate 400 students.

For a classroom population of 20 students, areas to accommodate the above mentioned services, and spaces flexible to be used in a variety of capacities, the following elementary school size is suggested:

**Elementary Schools**

**Range: 200-730 students**  
**Preferred: 350-600 Students**

# Elementary School Size

## Elementary Schools

**Range: 200-730 students**

**Preferred: 350-600 students**

Most elementary schools follow either a self-contained, grade-level teaming, or multi-age model of education. Self-contained is the most common, with the other two methodologies evolving. In a small school, under 250 students, there are 1-2 teachers per grade; there are very few choices for parents/students. In the U.S., many schools with small enrollments have split classes because of the number of students per grade level.

Recently, the most common size for elementary schools has been approximately 360-480 students. Based on a class size of 20 students, this number requires 3-4 teachers at each grade level. There are sufficient numbers of students to support specialized curriculum, such as art, music, PE, and library/media services without over-taxing these program areas. There are also opportunities to provide choices within the organization to meet the different learning styles of children.

A 1993 study showed that highest achievement [on three standardized tests] came from smaller elementary schools.

Cost effectiveness is another factor to consider. Research shows that as school size increases, cost decreases and program offerings are greater.

Class size is a major factor in determining what the minimums and maximums should be.

**Conclusion:** Suggested size of an elementary school is a range of 200-730 students. The preferred size of an elementary school is 350-600 students.

# Elementary School Site

**Site Size:** Minimum of 10 Useable Acres Plus 1 Acre Per 100 Students

Suggested School site requirements for Montgomery County Public Schools are as follows:

School Site Space Requirements	Approximate Size [square feet]	Useable Acres
<b>Building Footprint</b>	80,000	1.83
<b>K-2/3-5 Playgrounds</b>	30,000	0.69
<b>Parking and Drives</b>	130,000	2.96
<b>Play Fields:</b> <ul style="list-style-type: none"> <li>• One multi-purpose field</li> <li>• Two softball fields</li> <li>• Two basketball courts</li> </ul>	130,000	2.96
<b>Outdoor Learning Area</b>	4,000	0.09
<b>Subtotal</b>	274,000	6.26
<b>Add 30% Greenspace</b>	82,200	1.88
<b>Grand Total</b>	456,200	10.41

The following are suggestions for safety and security:

- use high trees and low bushes [less than three feet high] to deter hiding
- use aesthetically pleasing fencing around perimeter of the building
- place some buildings or a tree buffer along the perimeter of the property to avoid extensive fencing
- non-intrusive lighting of all areas [not correctional-type lighting]
- provide security lighting around building and parking lots with photocell timer with on/off capacity
- separate physical education and play areas
- recess building on site to avoid vehicular and pedestrian conflicts



# Elementary School Site

## Commentary:

The elementary school site is as important to education as the building itself. The outside aspects of the location affect students, staff, parents, and community members. Safety is a major concern, as is the most effective use of available space. Aesthetics and attractiveness of the site are also important.

Increasingly, school sites are being used for community recreation purposes. Furthermore, off-street bus loading, increased parking demands, and attempts to separate buses, vehicular traffic and pedestrian access to buildings are causing the need for larger school sites.

## References:

The Council of Educational Facility Planners, International [CEFPI] recommends ten acres plus one acre per 100 students. CEFPI standards applied to a 500-student elementary school would yield 15 acres.

The state of Virginia, in their draft standards, recommends a minimum site size of four acres plus one acre per 100 students. Using these standards, an elementary school of 500 students would equate to nine acres.

The Virginia Department of Education states the following guidelines for minimum outside play areas.

Size [in feet]	Area	up to 399 students	400-599 students	600 or more students
100 X 120	Multi-Use [Hard Surfaces]	1	2	2
100 X 120	Fitness Development Fenced Equipment Area [PK-1]	1	1	1
100 X 120	Fitness Development Fenced Equipment Area [2-5]	1	1	1
180 X 140	Multi-Use Field Play Area	1	1	2

The Virginia Department of Education states that "driveways and service drives shall not encircle the school, nor serve as pedestrian walks. Bus loading areas shall be separated from other vehicular traffic."

## Conclusion:

The suggested minimum elementary school site size standard is ten useable acres plus 1 acre per 100 students. A larger site should be considered if the site is also to be used for community/recreation purposes.

**Montgomery County Public Schools**

**Suggested  
Space Requirement  
Standards**

# Space Program Standards

**Elementary School Size:** 500 students

**Student/Classroom Ratio:** 20/1

Program Area		Suggested Standard: Square Feet
Kindergarten		1,000-1,100
Regular Classroom		800-900
Art Room		1,000
Music Room		1,000
Computer Room		900-1,000
Resource Room		400
Library/Media Center		2,750
Reading Room	1,750	
Workroom	330	
Office	120	
Technology Head-End Room	150	
Storage	200	
Conference Room	200	
Gymnasium		4,000/6,800
Cafeteria		4,500
Dining	2,500	
Food Service	2,000	
Administration Spaces		2,500
Reception Area		
Secretarial Work Area		
Principal's Office		
Conference Room		
Mail/Work/Copy Room		
Storage		
Vault		
Restroom		
Guidance		
Guidance Records		
Health Unit		
Itinerant Office		
Parent Volunteer Room		
Teacher Prep/Work Room		250-450
Teacher Lounge		300

## Space Program Standards

If possible, the addition of the following spaces is suggested:

Program Area	Suggested Standard: Square Feet
Preschool	1,000-1,100

# Kindergarten Classroom

**Size:** 1,000-1,100 SF

**Commentary:** Kindergarten classrooms require space for student desks, the ability to arrange the furniture in small groups, an area for movement to develop motor skills, space for quiet time, and hands-on activities, frequently in "centers".

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends a minimum of 975 square feet for a kindergarten classroom.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 34, recommends 1,200 square feet as ideal and 1,050 square feet as acceptable for a kindergarten classroom to accommodate 25 students, furniture, equipment, and flexible use of space.

*Indiana State Board of Education School Facility Guidelines*, adopted September 6, 1995, Section Guidelines for Conventional School Facilities, Section 6, states an area of 1,100 square feet for 30 students in a kindergarten classroom.

The Ohio School Facilities Commission's *Ohio School Design Manual*, 1999, recommends 1,200 square feet for a kindergarten classroom for 25 students.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 825 square feet for 20 students in a kindergarten classroom.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 900 square feet for 20 students in a kindergarten classroom.

The FUSS Study recommends 1,025 square feet.

**Conclusion:** The suggested area is 1,000-1,100 square feet for a kindergarten classroom.

## Regular Elementary Classroom

**Size:** 800-900 SF

**Commentary:** A typical classroom accommodates 20 students, along with appropriate furniture, equipment, and storage. Elementary instructional methodologies vary from cooperative learning to individualized instruction. Hands-on activities, the need for movement around the room, the use of "centers," integration of technology, and project-based curriculum require flexibility of movement in the room.

Staff developed the following list, which demonstrates the variety of activities a classroom needs to support:

1. Classroom arrangement should allow for ease of movement without bumping, tripping, etc.
2. Classrooms should accommodate 2-3 adults in a room at the same time.
3. Inclusion/Special Needs students require more space if they are wheelchair bound or need extra teacher attention.
4. Teachers of all grades, K-5, should have the option of student tables or desks. The option of tables requires more space.
5. Cooperative grouping/learning calls for room for student interaction.
6. A common "sharing" area on floor where students sit as a group should be programmed into each classroom.
7. Computer stations need to be where separate groups of students can talk and interact away from the whole group.
8. Hands-on learning [science, math, language arts, social studies, etc.] requires many manipulatives.
9. Storage space in each classroom is needed, especially for manipulatives of subjects mentioned above, books, supplies, etc.
10. Large storage spaces are necessary for large student works-in-progress; many projects are on going over time.
11. Size of children of different ages and space between children in classrooms should be considered in planning a school.
12. Upper elementary grades are starting to be taught with existing teaching methods of kindergarten and primary grades.

## Regular Elementary Classroom

### References:

The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends a minimum of 800 square feet for a classroom.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 34, recommends 900 square feet as ideal and 800 square feet as acceptable for an elementary classroom.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 7, states an area of 900 square feet for 30 students. The equivalent area for 25 students is 750 square feet.

The Ohio School Facilities Commission's *Ohio School Design Manual*, 1999, recommends 900 square feet for a classroom for 25 students.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 800 square feet for 25 students.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 720 square feet for 25 students.

The FUSS Study recommends 850 square feet.

The staff involved in the review workshop suggested a classroom of 900 square feet.

### Conclusion:

The suggested area is 800-900 square feet for 20 students.

# Art Room

**Size:** 1,000 SF

**Commentary:** The elementary art classroom should be large enough to accommodate a variety of art instruction, including drawing, painting, computer graphics, sculpture and model making, collage, fiber arts, and ceramics. In addition to art projects, the room must accommodate appropriate storage and a cleanup area.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends a minimum of 45 square feet per student, or 900 square feet, excluding storage and a kiln room.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 39, recommends 45 to 50 square feet per student to accommodate students, furniture, equipment, and flexible use of space. The equivalent area for 20 students is 900-1,000 square feet.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 7, provides for a separate art room of 1,000 square feet including permanent storage.

The Ohio School Facilities Commission's *Ohio School Design Manual*, 1999, recommends 1,200 square feet for an art room for 25 students.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 800 square feet for 28 students.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 1,200 square feet for 25 students.

The FUSS Study recommends 1,000 square feet.

**Conclusion:** The suggested area is 1,000 square feet plus 180 SF for a kiln and storage.



# Music Room

**Size:** 1,000 SF

**Commentary:** Elementary school music programs typically require freedom of movement, as the program involves singing, playing musical instruments, as well as dancing. Adequate space for risers, music stands, piano, chairs, and computer stations is needed within the music room.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends 20 square feet per member of the largest band group or 15 square feet per member of the largest choral group.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal* (None given)

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 7, states an all-purpose music room of 1,000 square feet plus adequate storage and lockers.

The Ohio School Facilities Commission's *Ohio School Design Manual*, 1999, recommends 1,200 square feet for a music room for 25 students.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 800 square feet for 25 students.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 1,200 square feet for 25 students.

The FUSS Study recommends 1,000 square feet.

**Conclusion:** The suggested area is 1,000 square feet plus 100 SF for instrument storage.

## Resource Room

**Size:** 400 SF

**Commentary:** Smaller group areas are needed for tutorial work, pullout instruction, conferences, counseling, physical therapy, Title 1, reading, OT/PT, gifted, speech, special education, consulting teacher, small group counseling, testing conferences, and numerous other functions.

In addition, there is the need for small group instruction space spread throughout the building. There should be resource rooms, office areas, and other small group rooms in a school.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends 400 square feet.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal* (None given)

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 5, states 30 square feet for each student.

The Ohio School Facilities Commission's *Ohio School Design Manual*, 1999, recommends 900 square feet.

The Kentucky *Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 400 square feet for 12 students.

The West Virginia *Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 720 square feet for 15 students. The equivalent area for 20 students is 960 square feet.

The FUSS Study recommended 500 square feet for a resource room, in addition to other office and small group space.

**Conclusion:** The suggested area is 400 square feet, plus small group spaces spread throughout the building.  
A total of 4 rooms at 400 Sq. Ft. each or 1 for every 100 students, whichever is greater.

## Library/Media Center

**Size:** Reading Room – 1,750 SF; Total Area – 2,750 SF

**Commentary:** The standards for libraries/media centers are complicated by addressing the size of the reading room versus the size of the entire library/media center facility. At times, standards are given for the reading room, and at other times it is for the entire library and support spaces

The reading room/circulation area houses shelving for books, tables, computer stations, and comfortable seating, in addition to the check-out desk area. It should be a comfortable, inviting, and quiet area.

Students may study, read, do research, check out materials, or work in small groups.

Usually the number of books or volumes, in a reading room is directly proportional to the student capacity.

Many library planners and the requirement for school accreditation require the library to accommodate 10% of the students.

**Resources:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends a minimum of 750 square feet plus two square feet times the total enrollment. For a 500-student school, this equates to 1,750 square feet.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 39, recommends 30 square feet per student as acceptable for a library to accommodate 15 percent of the student body with furniture, equipment, and flexible use of space. For a school of 500 students, the library/media center would be 2,250 square feet.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 7, states a library should contain a minimum of 1,000 square feet sufficient to seat 10 percent of the student body at 25 square feet per student. For 500 students, the size would be 1,250 square feet.

## Library/Media Center

### Resources:

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 1,470 square feet for a 300-student capacity.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 2,400 square feet for a capacity of 540 students.

The FUSS Study recommended a Reading Room of 2,200-2,400 SF, with the total library size of 2,980-3,180 square feet for 600 students.

### Conclusion:

The reading room should accommodate 10% of the student capacity. The allowance of 35 square feet per student is adequate space for students, books, and shelving. The suggested area for the reading room is 1,750 square feet.

The entire library should be based on 10% of student capacity with an allowance of 55 SF per student.

# Gymnasium

**Size:** 4,000 SF, excluding storage, offices, and restrooms

**Commentary:** A variety of activities such as physical fitness, gross motor skills, basketball, and volleyball can take place in the gym, as well as assemblies and community use. The basketball court in an elementary gym should be 40' x 60', with a suggested 5' clearance on each side.

**Resources:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends a minimum of 3,150 square feet.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal* (None given)

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 7, states an indoor facility should have 4,000 square feet, exclusive of safety lanes.

The Ohio School Facilities Commission's *Ohio School Design Manual*, 1999, recommends 3,500 square feet for 400 students.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 5,050 square feet for all capacities.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 3,100 square feet for 340- to 540-student capacity.

The FUSS Study recommended 4,000-5,000 square feet.

**Conclusion:** The suggested area is 4,000 square feet.

If the school gymnasium were to be designed to include community recreation programs, a 6,800 square feet gym would be required to accommodate a full-size basketball court.

A stage of 1000 Sq. Ft. should be provided in either the gymnasium or cafeteria dining space.

## Food Service

**Size:** 2,000 SF

**Resources:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends 1,000 square feet plus one square foot times total enrollment, or 1,500 square feet for a school of 500. This does not include an office, storage, or freezers.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 43, recommends 2 square feet per meal served as acceptable for a kitchen. (Area for the entire food service is not given.)

The Ohio School Facilities Commission's *Ohio School Design Manual*, 1999, recommends 1,700 square feet for 400 students.

Kentucky *Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 2,200 square feet with 300- to 599-student capacity.

West Virginia *Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 1,475 square feet with 340- to 440-student capacity.

The FUSS Study recommended 2,500 SF for 600 students.

**Conclusion:** The suggested area is four SF multiplied by the number of students, or 2,000 SF for a 500-student elementary school.

# Student Dining

**Size:** 2,500 SF

**Commentary:** The student dining area is used as a cafeteria, multi-purpose area, a place for guest lectures, and for a variety of community functions.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends 12 square feet times one-third of the total enrollment, or 2,000 square feet for a school of 500.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 43, recommends 10- to 14-square feet per seated student. An equivalent area for a student capacity of 600 is 2,400 square feet.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 5, states a multipurpose area for eating shall be provided on the basis of 12 square feet per student. An equivalent area for a student capacity of 600 is 2,400 square feet.

The Ohio School Facilities Commission's *Ohio School Design Manual*, 1999, recommends 3,000 square feet.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 3,000 square feet for 300- to 599-student capacity

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 1,800 square feet for 440-student capacity

The FUSS Study recommended 2,100-2,400 SF for 600 students.

**Conclusion:** The suggested size of 2,500 square feet is based on the assumption that this space will be used for assembly-type programs. The use of 15 square feet per student multiplied by one-third of the student population is recognized as the area required for tables, chairs, and circulation within the space. Furthermore, this assumes that there is a separate gymnasium.

A stage of 1000 Sq. Ft. should be provided in either the gymnasium or cafeteria dining space.

## Administrative and Guidance Spaces

**Size:** 2,500 SF

**Commentary:** The administration area includes reception areas, secretarial work areas, offices, workroom, guidance, health, and other support areas.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, provides no square footage guidelines.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, pages 44 and 45, recommends 2,775 square feet minimum for the administrative area.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Buildings (None given)

The Ohio School Facilities Commission's *Ohio School Design Manual*, 1999, recommends 2,755 square feet.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 1,720 square feet for 300-to 599-student capacity.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 1,830 square feet for 340-student capacity.

The FUSS Study recommended 2,000-2,400 square feet.

**Conclusion:** The suggested area is 2,500 square feet.



## Teacher Prep Area/Workroom

### **Commentary:**

Teachers and other staff members require a space where team meetings and class preparation can take place. The room should provide certain features that facilitate professional interaction, thus improving communication, professional development, and team building.

Teachers need dedicated space to prepare for classroom instruction, meet with other teachers, and hold parent conferences. This area should be separate from, but near the classroom.

The room should accommodate tables and chairs for meeting and workspace as well as storage for instructional materials.

### **References:**

There were no state guidelines for this area.

The FUSS Study recommended two [450 SF] areas.

### **Conclusion:**

There are several ways in which the necessary teacher space may be configured. Typically, these are planning areas that vary from 250-450 SF and are located throughout the building.

The suggested area for teacher lounge areas should be 300 square feet, plus storage space, and located in the various academic areas of the building. This is based on 50 SF per teacher.

## Pre-School Classroom

**Size:** 1,000-1,100 SF

**Commentary:** Increasingly, pre-school programs are incorporated into elementary schools. School districts are required to provide pre-school education for certain special needs populations. To provide flexibility in building use, it is suggested that this classroom be at comparable size to a kindergarten classroom.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, does not include recommendations for a pre-school classroom.

Most of the other state guidelines reviewed do not include guidelines as well.

The FUSS Study recommends a minimum of 850 square feet.

**Conclusion:** The suggested area is 1,000-1,100 square feet for a pre-school classroom.

**Montgomery County Public Schools**

**Capacity Size  
Standards**

# Capacity Size Standards

## Introduction

How many students can a building accommodate? This question often arises, and in the development of a facility plan, it can be one of the most debated issues. The answer to this question can impact the need for constructing new buildings as well as additions and can have a profound impact on revenue especially if projects are funded through state or other agencies.

It is not uncommon to review an evaluation of an existing building only to find that the capacity which had once been assigned to the building is much greater than what can be reasonably accommodated.

During the past thirty years, the programs in a public school system and the manner in which they are delivered have changed significantly. Repeated arguments are heard that "this school was able to accommodate 600 students thirty years ago and now you are saying it can only accommodate 400 students today. How can this be the case?" Persons making these statements often do not realize that class size has been reduced, the music program was being held on the stage, there was no art room and the teacher used a cart, computers had not been invented so there were no computer labs, the Kindergarten program went from half day to full day and severely handicapped special education students that were institutionalized are now attending public schools. Add to this the fact that many states are legislating a class size of 20 or under for the early elementary grades, schools are expanding pre-school services, and there are many more at-risk students programs.

Historically school districts throughout North America have determined the capacity of school by counting the number of classrooms in a building and multiplying by an average class size. In facility planning terminology we have used the term, "design capacity", to describe this methodology. Even though at first glance this seems only to be common sense, this methodology does not take into account the programmatic implications of school facilities. In an elementary school there is a need for libraries/media centers, administrative areas, special education classrooms, and specialized spaces for specific program areas such as science, art and music. In a secondary school, in theory it may be possible to use every classroom every period of every day, but from a practical perspective it is not likely. In facility planning terminology, taking program issues into consideration, we use the term, "functional capacity".

Even though functional capacity is a more realistic analysis of what a building can accommodate, it is necessary to apply some common sense. There are examples in which classrooms have been taken over for other purposes such as teacher prep areas, storage, or offices, which can result in a lower capacity figure.

Public schools use space in school buildings for special purposes such as community activities or district-wide special education programs when space is available in a building. The location of this type of program impacts the number of students the building can accommodate. For planning purposes, functional capacity assumes these special programs could be moved to another location. Therefore functional capacity is defined as the number of student the building can accommodate assuming a "traditional" educational program.

The formula used for determining capacity should reflect the programs of the public schools yet should be kept simple for planning purposes. The method for determining functional capacity is different for elementary, middle and high schools.

# Capacity Size Standards

## Elementary School Capacity

The following criteria are suggested for consideration in determining functional building capacity at the elementary level.

### Average Class Size:

The Montgomery County Public Schools are striving for an average class size of 20 students per class. Therefore, this is the number that should be used in determining capacity.

### Special Education:

Special Education instruction occurs at various levels of need, varying class sizes, and in various locations throughout the district. Instructional areas for high incident students [learning disabled, behaviorally and mildly mentally handicapped, etc.] are usually found at most elementary schools.

For planning purposes, functional capacity assumes that low incident students [severely profoundly handicapped] are not located in the building and are being housed at a different district facility.

For discussion purposes let's assume that a building can accommodate 500 students without housing the low incident or severely profoundly handicapped students. On the other hand, a building may have four classrooms dedicated to serving this population. In this case the capacity may be reduced to 420 students.

It is suggested for buildings that house low incident or severely profoundly handicapped students that two capacity figures be established: one calculation including this population and one not including this population. [The reason being that if the building is not to be used for this purpose, it has the potential for housing more students.]

### Art and Music Spaces:

In nearly every elementary school in North America, art and music instruction are important parts of a well-rounded elementary curriculum. Therefore spaces for each of these programs should be included in Montgomery County Public Schools elementary schools. In schools with fewer students, these programs may need to be combined into one space.

### Technology Labs:

Even though the future solution is to have technology integrated into all instructional spaces, the current practice is to have designated computer labs in elementary schools.

### Science Classrooms:

State proficiency testing has placed an increased emphasis on science curriculum at the elementary level. Currently science instruction is limited to what can be done in the regular classroom. Montgomery County Public Schools should consider providing a separate classroom for science.

# Capacity Size Standards

## Determining Elementary School Capacity

The elementary program is usually delivered based on students being assigned a homeroom or regular classroom and attending specials such as art and music in a specialized classroom. The number of special classrooms should be a reflection of the enrollment of the building.

For example: if a school has only one classroom for each grade it would only require a part-time art room. Whereas if there are three classrooms for each grade, a full time art classroom would be needed. Or, for example, a school with 200 students may only require one special education classroom whereas a school for 400 may require two or more classrooms for special education.

School districts often change the use of an individual classroom from year to year. One year the classroom may be a regular classroom. The next year it may be a special education classroom and the year after that a computer room. Since these changes do occur, the simplest procedure would be to count the total number of classrooms and subtract the number for special purposes and then multiply the remainder by a class size of 20. This may not be perfect, but by using this method the only information needed would be the total number of classrooms in a building.

The table below is the suggested capacity standards for elementary schools.

<b>Elementary School Space Allocation</b>				
<b>Total # of Students</b>	<b>300</b>	<b>400</b>	<b>500</b>	<b>600</b>
Pre-School Room	1	1	1	1
Kindergarten Classrooms	3	4	4	5
Regular Classrooms	12	16	21	25
Art Room	1	1	1	2
Music Room	1	1	1	2
Primary Technology Room [K-2]	1	1	1	2
Computer Room [3-5]	1	1	1	2
Science Room	1	1	1	2
Library/Media Center	1,500	2,000	2,500	3,000
Gymnasium	4,000	4,000	4,000	4,000
Cafeteria (Dining)	1,500	2,000	2,500	3,000

## Building Circulation and Construction

- Size:** 35% of total space to be allocated for construction and circulation.
- Commentary:** Constructing a building includes more than classrooms, gymnasiums, and program spaces. A building also includes circulation spaces and construction factors such as wall thickness. This includes hallways, locker areas, vestibules, etc.
- References:**
- The State of Virginia draft regulation for Public School Building Construction, dated 1994, does not include recommendations or circulation and construction.
- The most comprehensive analysis of programming circulation factors in K-12 facilities has been developed by Fanning/Howey Associates Inc. which has offices in Florida, Ohio, Indiana, Michigan, Pennsylvania, Kentucky, and Virginia.
- The recommendation percentage for circulation and construction is based on analysis of 97 schools constructed in the past four years.
- Conclusion:** The suggested amount of space to be allocated for construction and circulation should be 35%.

# **Montgomery County Public Schools**

## **Middle Schools**

Suggested Space Requirement Standards  
and  
Capacity Size Standards

***Adopted  
February 8, 2000***

DeJong & Associates, Inc.



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**October 29, 1999**

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# Introduction

The purpose of this document is to provide suggested program space standards and capacity criteria for the Montgomery County Public Schools.

The proposed standards enclosed are an update of the standards developed in 1995. These standards take into consideration current programs and services, draft guidelines developed by the Virginia Department of Education, recommendations from the Council of Educational Facility Planners, International [CEFPI], and information derived from various states and non-profit organizations.

The standards established for Montgomery County Public Schools must meet the student and programmatic needs that exist. These standards should be used as a guide for planning, designing, and evaluating school facilities. These standards should also be used in helping understand future renovations, additions, and new construction that may be needed.

## Middle School Standards

The attached suggested standards are based on an the following criteria:

<b>Grade Configuration:</b>	6-8
<b>School Size:</b>	Preferred 350-1200 Students
<b>Student/Classroom Ratio:</b>	20/1
<b>Site Size:</b>	Minimum 20 Useable Acres Plus 1 Acre Per 100 Students

## Middle School Size

As Montgomery County Public Schools develops a long-range facility plan, the optimum size of schools will be important to determine.

Research on this topic often associates small with rural schools and large with urban schools. This is not always the case. Furthermore, there are a wide variety of definitions of what is small and what is large. In some districts a middle school of 800 students maybe classified as a large middle school. In other areas such as Chicago, Phoenix, or Atlanta, an 800-student middle school would be defined as small.

Even though there is a great amount of debate on this topic, in general, research would indicate the following:

<u>Variable</u>	<u>Favor Large or Small School</u>
<b>Academic Achievement</b> [Several recent studies favor small schools, especially for low SES students.]	Smaller Schools
<b>Parent Involvement</b> [PTA, volunteers, tutoring, fund-raising, etc.]	Smaller Schools
<b>Educational Opportunities</b> [choice, more diverse program offerings, multiple foreign languages, etc.]	Larger Schools
<b>Cost Effectiveness</b> [more students to average overhead costs, e.g. media specialists, principals, secretaries, food service, athletics, etc.]	Larger Schools
<b>Sports/Athletics/Competition</b> [win more games, awards at band concerts, etc.]	Larger Schools
<b>Student Participation</b> [greater percentage can be on teams, leadership in band, clubs]	Smaller Schools
<b>Discipline</b> [greater sense of belonging, easier to "control"]	Smaller Schools

Schools built years ago were built small to begin with. The incorporation of middle school teaming concepts, smaller class sizes, more exploratory/elective offerings, media centers, special education, computer labs, Title/Chapter I, as well as other special services, required the conversion of space that was for regular classrooms to be used for these special services. A school that could once accommodate 1000 students, today might only be able to accommodate 800 students today.

## Middle School Size

For a classroom of 20 students, area to accommodate the above-mentioned services, and spaces flexible to be used in a variety of capacities, the following middle school sizes are suggested:

### Middle Schools

### Up to 600 Students

### 600-900 Students

### 900-1200 Students

Across Virginia and the U.S., there are a variety of grade configurations found at the middle school level. The 6-8 grade configuration is the most common. Most middle school faculties are organized into interdisciplinary teams. A four-teacher team serves approximately 80-100 students. Montgomery County Public Schools middle schools also utilize faculty teams that may vary from 2 to 6 in number, and that may include specialty teachers as well as core teachers.

The middle school organizational structure lends itself to a new way of organizing a building. Many middle schools are organized into pods, houses, or cluster arrangements. These arrangements provide a sense of smallness for faculty and students in a building that has a larger enrollment.

Cost effectiveness is another factor to consider. Research shows that as school size increases, cost tends to decline and program offerings increase. The ideal range, cost-wise, seems to be between two and three teams of teachers per grade, or somewhere between 480 and 900 students.

**Conclusion:** Given the varied size of student populations that make up the communities of Montgomery County, the suggested size for a middle school may range from small (less than 600 students) to large (900-1200 students).

## Middle School Site

**Site Size:** 20 Useable Acres Plus 1 Acre Per 100 Students

School site requirements for Montgomery County Public Schools are as follows:

<b>Middle School Site Space Requirements for 600 Students</b>	<b>Approximate Size [sq. ft.]</b>	<b>Acres</b>
<b>Building Footprint</b>	100,000	2.29
<b>Parking and Drives</b>	40,000	0.92
<b>Play Fields:</b> <ul style="list-style-type: none"> <li>• One six-lane running track with soccer/football and events field in track interior</li> <li>• One baseball field</li> <li>• Two softball fields</li> <li>• Two basketball courts</li> </ul>	500,000	11.47
<b>Outdoor Learning Area</b>	4,000	0.09
<b>Subtotal</b>	644,000	14.77
<b>Add 30% Greenspace</b>	193,200	4.43
<b>Grand Total</b>	837,200	19.20

<b>Middle School Site Space Requirements for 900-1200 Students</b>	<b>Approximate Size [sq. ft.]</b>	<b>Acres</b>
<b>Building Footprint</b>	120,000	2.75
<b>Parking and Drives</b>	70,000	1.61
<b>Play Fields:</b> <ul style="list-style-type: none"> <li>• One six-lane running track with soccer/football and events field in track interior</li> <li>• One baseball field</li> <li>• Two softball fields</li> <li>• Two multipurpose fields</li> <li>• Four basketball courts</li> </ul>	800,000	18.35
<b>Outdoor Learning Area</b>	7,000	0.16
<b>Subtotal</b>	997,000	22.87
<b>Add 30% Greenspace</b>	299,100	6.86
<b>Grand Total</b>	1,296,100	29.73

## Middle School Site

The following are suggestions for safety and security:

- use high trees and low bushes [less than three feet high] to deter hiding
- use aesthetically pleasing fencing around perimeter of the building
- place some buildings or a tree buffer along the perimeter of the property to avoid extensive fencing
- non-intrusive lighting of all areas [not correctional-type lighting]
- provide security lighting around building and parking lots with photocell timer with on/off capacity
- separate athletic fields and informal gathering areas
- locate athletic facilities away from building
- recess building on site to avoid vehicular and pedestrian conflicts

### Commentary:

The middle school site is as important to education as the building itself. The outside aspects of the location affect students, staff, parents, and community members. Safety is a major concern, as is the most effective use of available space. Aesthetics and attractiveness of the site are also important.

Increasingly, school sites are being used for community recreation purposes. Furthermore, off-street bus loading, increased parking demands, and attempts to separate buses, vehicular traffic and pedestrian access to buildings are causing the need for larger school sites.

### References:

The State of Virginia, in their draft standards, recommends a minimum site size of ten acres plus one acre per 100 students. Using these standards, a middle school with a minimum of 600 students would equate to 16 acres. A school with 900 students would require 19 acres, and a school with 1200 students would require 22 acres.

The Council of Educational Facility Planners, International [CEFPI] recommends 20 acres plus one acre per 100 students. CEFPI standards of a 600-student middle school would yield 26 acres, and 32 acres for 1200 students.

## Middle School Site

**References:** The Virginia Department of Education states the following guidelines for minimum outside play areas.

Size (in feet)	Area	up to 599 students	600-899 students	900 or more students
100 X 120	Hard Surfaces	1	2	2
100 X 150	Fitness Development Equipment Area	1	1	1
200 X 400	Field Games Area	2	2	3

The Virginia Department of Education states that “driveways and service drives shall not encircle the school, nor serve as pedestrian walks. Bus loading areas shall be separated from other vehicular traffic.”

**Conclusion:** The suggested minimum school site size standards are as follows:

- Up to 600 students      26 acres
- 900 students      29 acres
- 900 - 1200 students      32 acres

Larger sites should be considered if the site is also to be used for community/recreation purposes.



**Montgomery County Public Schools**

**Suggested  
Space Requirement  
Standards**

# Space Program Standards

**Middle School Size:** 600 students

**Student/Classroom Ratio:** 20/1

Program Area		Suggested Standard Square Feet
Core Classroom		800-850
Science Room		1,000-1,200
Health Classroom		800-850
Art Room		1,200
Choral Room		1,400
Band Room		1,800
Teen Living		1,500
Tech Lab		2,500
Agricultural Lab		2,000
Computer/Keyboarding Labs		900
Foreign Language		800-850
Resource Room		400
Library/Media Center		4,500
Reading Room	2,800	
Classroom		
Workroom		
Office		
Technology Head-End Room		
Storage		
Gymnasium		8,000
Auditorium		5,000
Cafeteria		5,400
Dining	3,000	
Food Service	2,400	

## Space Program Standards

Program Area	Suggested Standard Square Feet
Administration and Guidance Spaces	4,500
Reception Area	
Secretarial Work Area	
Principal's Office	
Assistant Principal's Office	
Conference Room	
Mail/Work/Copy Room	
Storage	
Vault	
Restroom	
Guidance Waiting Area	
Guidance <i>[2 at 150 each]</i>	
Career Center	
Conference Room	
Guidance Records	
Health Unit	
Itinerant Offices	
Parent Volunteer Room	
Teacher Prep/Work Room	300-600

## Core Classroom

**Size:** 800-850 SF

**Commentary:** A typical classroom accommodates 20 students, along with appropriate furniture, equipment, and storage. Middle school instructional designs include large-group, small group, and independent activities. Hands-on and interactive activities, research, group problem solving, integration of technology, and project-based learning require flexibility of movement in the room. Additionally, classroom furnishings often include tables rather than individual desks.

The adoption of an inclusion model for serving disabled students creates a need for space to accommodate more adults per classroom, wheelchairs, and other assistive devices.

The integration of technology creates needs for approximately 150-200 sq. ft. to accommodate 6 to 8 computer stations.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends a minimum of 700 square feet for a classroom.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 34, recommends 850 square feet as ideal and 750 square feet as acceptable for a middle school classroom to accommodate 25 students, furniture, equipment, and flexible use of space.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 8, states an area of 900 square feet for 30 students.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 750 square feet.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 720 square feet.

The FUSS Study recommended 700-785 square feet.

**Conclusion:** The suggested area is 800-850 square feet.

# Science Room

**Size:** 1,000-1,200 SF

**Commentary:** A science classroom should be flexible for large and small instruction. Experimentation, laboratory work, planetary study, greenhouse work, and computer research are some of the activities that will be held in the science room. In addition, space for science preparation and chemical storage is required.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends 45 square feet per student in a combined laboratory/classroom. A classroom for 20 students would yield 900 square feet. For a separate laboratory or classroom, the recommendation is 35 square feet per student.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 39, recommends 1,200 square feet as ideal and 1,080 square feet as acceptable for a science laboratory to accommodate 24 students, furniture, equipment, and flexible use of space.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 8, states 40 square feet per student or a minimum of 1,200 square feet for a science laboratory.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 1,000 square feet.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 1,200 square feet for 25 students.

The FUSS Study recommended 1,000-1,200 square feet.

**Conclusion:** The suggested area is 1,000-1,200 square feet, not including the science prep area.

# Health Classroom

**Size:** 800-850 SF

**Commentary:** A health classroom will be used as part of the Physical Education curriculum. The classroom will be used for instruction of the cognitive aspects of Physical Education. The classroom also should be flexible enough to be used as a core classroom, if necessary.

Often, if classes are combined and form groups of 40-50 students, it is suggested that two health classrooms be located adjacent to each other with a moveable wall in between. This would allow for two separate classes or one combined class.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, makes no recommendation for a specific health classroom.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 34, recommends 850 square feet as ideal and 750 square feet as acceptable for a middle school classroom to accommodate 25 students, furniture, equipment, and flexible use of space.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 8, states an area of 900 square feet for 30 students.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 750 square feet.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 720 square feet.

The FUSS Study recommended 800-850 square feet.

**Conclusion:** The suggested area is 800-850 square feet.

## Art Room

**Size:** 1,200 SF

**Commentary:** The art classroom should be large enough to accommodate a variety of art instruction, including drawing, painting, computer graphics, sculpture and model making, collage, fiber arts, and ceramics. In addition to art projects, the room must accommodate appropriate storage and a cleanup area.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends 45 square feet per student, or 900 square feet for 20 students.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 39, recommends 1,400 square feet as ideal and 1,260 square feet as acceptable for an art room to accommodate 28 students, furniture, equipment, and flexible use of space.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 8, states that each school should have an art area of 50 square feet per student. The equivalent area for 20 students is 1,000 square feet.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 1,200 square feet.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 1,500 square feet for 25 students.

The FUSS Study recommended 1,200 square feet.

**Conclusion:** The suggested area is 1,200 square feet, plus space for a kiln and storage.

# Choral Room

**Size:** 1,400 SF

**Commentary:** Choir requires freedom of movement, as the program involves rehearsals for various sizes and types of vocal music groups, which could include choreography. Adequate space for risers, music stands, piano, chairs, and computer stations is needed within the choir room.

In addition, the additional square footage is needed to accommodate many classes with more than 60 students and storage requirements.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, states a minimum requirement of 15 square feet per member of the largest choral group.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 39, recommends 1,400 square feet as ideal and 1,200 square feet as acceptable for a vocal room to accommodate 40 students, furniture, equipment, and flexible use of space.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Buildings, Section 8, states that a vocal music room with 16 square feet per student is required.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 900 square feet for each program.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 1,200 square feet for 25 students.

**Conclusion:** The suggested area is 1,400 square feet.



## Band Room

**Size:** 1,800 SF

**Commentary:** Band requires freedom of movement, as the program involves playing musical instruments. Adequate space for music stands, piano, chairs, and computer stations is needed within the band room. Traffic flow must also be considered as students are moving in and out of the room with instruments of various sizes.

In addition, space should be provided for a music library, storage, and practice rooms. Programming should consider the fact that classes have 50-60 students.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, states a minimum requirement of 20 square feet per member of the largest band group.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 39, recommends 2,000 minimum square feet as acceptable for a band room to accommodate students, furniture, equipment, and flexible use of space.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 8, states that an instrumental music room at 20 square feet per student is required.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 2,500 square feet for a combination band/vocal room be provided for each program.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 1,200 square feet for 25 students.

The FUSS Study recommended 1,200-1,800 square feet.

**Conclusion:** The suggested area is 1,800 square feet, three practice rooms at 40 square feet each, and two practice rooms at 80 square feet each.

# Teen Living

**Size:** 1,500 SF

**Commentary:** This space is designed to serve a changing "home economics" program. The "home economics" program has changed to "life skills." Life skills include education of foods, sewing, parenting, personal hygiene, household budgeting, etc.

The room must accommodate appropriate storage cabinets and counter space in each area, in addition to food preparation and sewing equipment such as ranges, refrigerators, microwaves, sinks, sewing machines, and cutting tables.

Space for an instruction and demonstration area should also be considered in the classroom.

The District is reviewing the concept of modular style classroom arrangements, which would increase these SF requirements.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, does not state any recommendations.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 42, recommends 1,250 square feet as ideal and 1,000 square feet as acceptable for a lab to accommodate 25 students, furniture, equipment, and flexible use of space.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 9, states an area of 3,000 square feet for a home economics program when taught by a single teacher.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 2,400 square feet for a home economics unit area where one teacher is provided.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 950 square feet for 25 students.

The FUSS Study recommended 2,100 square feet.

**Conclusion:** The suggested area is 1,500 square feet.

# Technology Lab

**Size:** 2,500 SF

**Commentary:** The new approach in technology education involves the combination of modules and the traditional shop area. Therefore, the space should be large enough to accommodate a variety of separate areas. The distinct areas would include the following:

1. Classrooms with students desks/tables for group instruction
2. Dust-free environment for technology education modules [for example, rocketry, graphics design, etc.]
3. Fabrication area for power equipment used for woodworking, plastic forming, and possibly metalworking. Additional needs are tool cabinets, clean-up area with a sink and racks for storage, and work benches.
4. A small finishing room providing a dust-free and well-ventilated environment for finishing purposes [varnishing, painting, staining, etc.] and chemical storage.
5. Teachers' office for storage of documentation, such as equipment manuals, catalogs, warranties, and educational materials.
6. Adequate storage area for lumber, large pieces of equipment, etc.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, does not state any recommendations.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal* (None given)

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 8, states a laboratory area of 2,400 square feet.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 625 square feet for a technology education lab.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 1,000 square feet for 20 students. The equivalent area for 25 students is 1,250 square feet.

The FUSS Study recommended 2,100 square feet.

**Conclusion:** The suggested area is 2,500 square feet.

## Computer/Keyboarding Labs

**Size:** 900 SF

**Commentary:** A computer lab provides a place for desktop publishing, word processing, spreadsheet production, and multi-media presentation production. A dedicated lab must be available for Business Exploratory classes.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, does not state any recommendations.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 41, recommends a computer lab in a middle school.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 8, states a minimum of one computer room of 1,050 square feet must be provided.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 900 square feet.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 800 square feet for a computer lab.

The FUSS Study recommended 800-1,000 square feet.

**Conclusion:** The suggested area is 900 square feet.

# Foreign Language Classroom

**Size:** 800-850 SF

**Commentary:** A foreign language classroom accommodates 20 students, along with appropriate furniture, equipment, and storage. Middle school instructional designs include large-group, small group, and independent activities. Hands-on and interactive activities, research, group problem solving, integration of technology, and project-based learning require flexibility of movement in the room. Additionally, classroom furnishings often include tables rather than individual desks.

The adoption of an inclusion model for serving disabled students creates a need for space to accommodate more adults per classroom, wheelchairs, and other assistive devices.

The integration of technology creates needs for approximately 150-200 sp. ft. to accommodate 6 to 8 computer stations.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends a minimum of 700 square feet for a classroom.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 34, recommends 850 square feet as ideal and 750 square feet as acceptable for a middle school classroom to accommodate 25 students, furniture, equipment, and flexible use of space.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 8, states an area of 900 square feet for 30 students.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 750 square feet.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 720 square feet.

The FUSS Study recommended 700-785 square feet.

**Conclusion:** The suggested area is 800-850 square feet.

## Resource Room

**Size:** 400 SF

**Commentary:** Special needs students [special education, at-risk, gifted, etc.] need a variety of space rather than a traditional classroom. This variety would include a multi-purpose area for small group instruction and differentiation. Adjoining rooms should accompany this area so that appropriate supervision can be provided and concurrent activities can take place. These adjoining areas will be used for activities such as individual or small group testing, cooling off [time out] area, individual therapies, [PT/OT, music, counseling, etc.] and to meet students' toiletry/personal hygiene needs. A shower/bath should be installed in this area.

In addition to classroom space, tutoring and other resource areas are also needed. Since there is an increased emphasis on placing special needs students in the regular classroom, it is suggested that this room have the flexibility to be used as a regular classroom or as a special education room.

Special Education teachers need a small area to prepare for class instruction and to store educational materials as well as personal belongings. This space could accommodate itinerant teachers that often have to place for their materials and personal possessions.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends 750 square feet for 10 students.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal* (None given)

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 5, states 30 square feet for each student or a minimum of 900 square feet for a special education area.

The Ohio School Facilities Commission's *Ohio School Design Manual*, 1999, recommends 900 square feet.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 825 square feet for each program. The equivalent area for each program is 825 square feet.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 720 square feet for 12 students.

**Conclusion:**

The suggested area is 400 square feet per "house" plus small group spaces throughout the school - a total of 5 or 1 for every 100 students, whichever is greater.

## Library/Media Center – Reading Room

**Size:** Reading Room – 2,800 SF; Total Area – 4,500 SF

**Commentary:** The reading room/circulation area houses shelving for books, tables, computer stations, and comfortable seating, in addition to the check-out desk area. It should be a comfortable, inviting, and quiet area.

Students may study, read, do research, check out materials, or work in small groups.

Usually the number of books or volumes, in a reading room is directly proportional to the student capacity.

Many library planners and the requirement for school accreditation require the library to accommodate 10% of the students.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends at least 1,000 square feet, plus three square feet times the total enrollment. For a school of 600, this would yield a 2,800 square foot reading room.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 39, recommends 30 square feet per student for a minimum of 15 percent of the student body as acceptable for a library reading room.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 8, states that sufficient area for 10 percent of the student body at 25 square feet per student should be provided.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 2,730 square feet for a 600 student capacity.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 2,000 square feet for an capacity of 500 students.

The FUSS Study recommended approximately 4,600 square feet.



## Conclusion:

The room is to accommodate 10% of the student capacity with an allowance of 55 square feet per student. The allowance of 35 square feet per student is adequate space for students, books, and shelving.



The suggested area is 2,800 square feet for the reading room and 4,500 for the total library.

# Gymnasium

**Size:** 8,000 SF

**Commentary:** A variety of activities such as physical fitness, gross motor skills, basketball, and volleyball can take place in the gym, as well as assemblies and community use. The gymnasium should provide seating equal to the number of students in the building. If the community will be using the facility, the basketball court should be 84' X 50' and the facility should be expanded.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends a gymnasium size of 54' X 90' X 22', but does not provide guidelines for bleachers.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal* (None given)

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 7, states an indoor facility should have 4,000 square feet, exclusive of safety lanes.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 8,175 square feet for 450-student capacity.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 5,400 square feet for 500-student capacity.

The FUSS Study recommended approximately 8,000 square feet.

**Conclusion:** The suggested area is 8000 square feet, plus space for locker rooms and storage areas of approximately 4000 square feet, to include:

- Girls' Locker Room/Showers 1500 sq. ft.
- Boys' Locker Room/Showers 1500 sq. ft.
- Storage 1000 sq. ft.

An auxiliary gym of 7000 square feet should be considered for larger schools, to include a full-size basketball court if the gym will be used by the community.

# Auditorium

## Commentary:

The auditorium size should accommodate half of the student body [300 students] plus storage. The formula is ten square feet per seat plus approximately 2,000 square feet for stage area and additional circulation. The total suggested size is approximately 6,000 feet.

Consideration might be given for locating the auditorium functions and cafeteria functions adjacent to each other with moveable walls in between. This would create larger gathering places.

The total suggested size is approximately 5000 square feet for a school of 600 students. For 1200 students, the total suggested size is 8000 square feet.

## References:

No guidelines are given for auditorium size.

The FUSS Study recommended approximately 6,000-7,000 square feet.

## Conclusion:

The auditorium should be able to seat half of the student body at one time. Approximate square footage for a school of 600 students would be 5000 square feet, including storage and circulation areas. For a school of 1200 students, 8000 square feet would be needed.

The auditorium should accommodate multiple uses with an attached stage. Seating should be on tiered levels without fixed seats.

5900

## Food Service

**Size:** 2,400 SF

**Commentary:** This area would include a kitchen, walk-in freezer, W/I cooler, laundry area, restrooms, mop room, manger office, dish room, and a pot/pan area.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends 1,000 square feet plus one square foot times total enrollment, or 1,600 square feet for a school of 600. This does not include an office, storage, or freezers.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 43, recommends 2 square feet per meal served as acceptable for a kitchen. (Area for the entire food service is not given.)

The Ohio School Facilities Commission's *Ohio School Design Manual*, 1999, recommends 1,700 square feet for 400 students.

Kentucky *Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 2,200 square feet with 300- to 599-student capacity.

West Virginia *Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 1,475 square feet with 340- to 440-student capacity.

The FUSS Study recommended a kitchen of 2,500 square feet.

**Conclusion:** The suggested area is four SF multiplied by the number of students, or 2,400 SF for a 600-student middle school, or 4800 SF for a 1200 student school.

$$\begin{array}{l} 4 \times 480 = 1920 \\ 4 \times 285 = 1140 \end{array}$$

## Student Dining

**Size:** 3,000 SF

**References:**

The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends 1,000 square feet plus one square foot times total enrollment, or 1,600 square feet for a school of 600. This does not include an office, storage, or freezers.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 43, recommends 2 square feet per meal served as acceptable for a kitchen. (Area for the entire food service is not given.)

The Ohio School Facilities Commission's *Ohio School Design Manual*, 1999, recommends 1,700 square feet for 400 students.

Kentucky *Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 2,200 square feet with 300- to 599-student capacity.

West Virginia *Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 1,475 square feet with 340- to 440-student capacity.

The FUSS Study recommended a dining area of 2,800-3,200 square feet.

**Conclusion:**

The minimum size of 3,000 square feet is based on the assumption that this space will be used for assembly-type programs. The use of 15 square feet per student multiplied by one-third of the student population is recognized as the area required for tables, chairs, and circulation within the space. For a school of 1200 students, 6000 square feet is need.

$$15 \times \frac{480}{3} = 2400$$

15

## Administrative and Guidance Spaces

**Size:** 4,500 SF

**Commentary:** This area includes the administrative functions of the school combined with student support services. It serves as the coordinating role of the middle school, including overall instructional leadership, a safe productive learning environment, and building management.

This area includes reception areas, secretary work areas, principals' offices, guidance offices, health, and other support areas.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, does not state any recommendations.

The FUSS Study recommended 4,400-5,000 square feet.

**Conclusion:** The suggested area is 4,500 square feet.

## Teacher Prep Area/Workroom

**Size:** 300-600 SF

**Commentary:** Teachers and other staff members require a space where team meetings and class preparation can take place. The room should provide certain features that facilitate professional interaction, thus improving communication, professional development, and team building.

Teachers need dedicated space to prepare for classroom instruction, meet with other teachers, and hold parent conferences. This area should be separate from, but near the classroom.

The room should accommodate tables and chairs for meeting and workspace as well as storage for instructional materials.

**References:** There were no state guidelines for this area.

The FUSS Study recommended two [450 SF] areas.

**Conclusion:** There are several ways in which the necessary teacher space may be configured. Typically, these are planning areas that vary from 250-450 SF and are located throughout the building.

The suggested area for teacher lounge areas should be 300 square feet, plus storage space, and located in the various academic areas of the building. This is based on 50 SF per teacher.

**Montgomery County Public Schools**

**Capacity Size  
Standards**



# Capacity Size Standards

## Introduction

How many students can a building accommodate? This question often arises, and in the development of a facility plan, it can be one of the most debated issues. The answer to this question can impact the need for constructing new buildings as well as additions and can have a profound impact on revenue especially if projects are funded through state or other agencies.

It is not uncommon to review an evaluation of an existing building only to find that the capacity which had once been assigned to the building is much greater than what can be reasonably accommodated.

During the past thirty years, the programs in a public school system and the manner in which they are delivered have changed significantly. Repeated arguments are heard that “this school was able to accommodate 600 students thirty years ago and now you are saying it can only accommodate 400 students today. How can this be the case?” Persons making these statements often do not realize that class size has been reduced, the music program was being held on the stage, there was no art room and the teacher used a cart, computers had not been invented and there were no computer labs, the Kindergarten program went from half day to full day and severely handicapped special education students that were institutionalized are now attending public schools. Add to this the fact that many states are legislating a class size of 20 or under for the early elementary grades, schools are expanding pre-school services, and there are many more at-risk students programs.

Historically school districts throughout North America have determined the capacity of school by counting the number of classrooms in a building and multiplying by an average class size. In facility planning terminology we have used the term, “design capacity”, to describe this methodology. Even though at first glance this seems only to be common sense, this methodology does not take into account the programmatic implications of school facilities. In an elementary school there is a need for libraries/media centers, administrative areas, special education classrooms, and specialized spaces for specific program areas such as science, art and music. In a secondary school, in theory it may be possible to use every classroom every period of every day, but from a practical perspective it is not likely. In facility planning terminology, taking program issues into consideration, we use the term, “functional capacity”.

Even though functional capacity is a more realistic analysis of what a building can accommodate, it is necessary to apply some common sense. There are examples in which classrooms have been taken over for other purposes such as teacher prep areas, storage, or offices, which can result in a lower capacity figure.

Public schools use space in school buildings for special purposes such as community activities or district-wide special education programs when space is available in a building. The location of this type of program impacts the number of students the building can accommodate. For planning purposes, functional capacity assumes these special programs could be moved to another location. Therefore functional capacity is defined as the number of student the building can accommodate assuming a “traditional” educational program.

The formula used for determining capacity should reflect the programs of the public schools yet should be kept simple for planning purposes. The method for determining functional capacity is different for elementary, middle and high schools.

# Capacity Size Standards

## Determining Middle School Capacity

Most middle schools are a hybrid between elementary schools and high schools. Actually middle schools are the evolving school of the future. More and more elementary schools and high schools are adopting the middle school program delivery of team teaching.

In the past middle schools were called junior high schools and were “mini” high schools. They operated on a 6 to 9 period schedule and students rotated between classes. Many schools that are called middle schools still operate in this fashion.

On the other hand the middle school philosophy places students in teams. The size of these teams varies from school to school. A team may be two teachers and 40 students or teams may be as large as 6-8 teachers and 150-200 students. Regardless of the size of the team, the program typically consists of a core curriculum [English/language arts, math, science and social studies] and an exploratory curriculum of physical education, art, music, band, computers, technology, and foreign language. Depending on the individual middle school, there may be other exploratory areas as well.

Students usually attend the core curricular areas every day throughout the school year. There are a wide variety of schedules associated with the exploratory programs. Students may attend an exploratory program every day for 6-18 weeks and then move on to another exploratory program or they may attend exploratory programs on alternating days. There are as many different schedules as there are middle schools and you need to be a middle school student to figure it out.

Since there are two basic methods for delivering education at the middle or junior high school level, there are two different methods for determining capacity.

### Middle School Capacity

Schools that operate as middle schools, a modification of the elementary method for determining capacity applies. Find the total number of “regular” classrooms and multiply by the desired average class size, 20.

A school may have 30 classrooms for core curricular programs. This school may also have seven exploratory classrooms [art, band, choral, computer, technology, life skills, and physical education] and two special education classrooms. The capacity of the building would be 30 time 20 students per class, which equals 600 students.

## Building Circulation and Construction

- Size:** 35% of total space to be allocated for construction and circulation.
- Commentary:** Constructing a building includes more than classrooms, gymnasiums, and program spaces. A building also includes circulation spaces and construction factors such as wall thickness. This includes hallways, locker areas, vestibules, etc.
- References:**
- The State of Virginia draft regulation for Public School Building Construction, dated 1994, does not include recommendations or circulation and construction.
- The most comprehensive analysis of programming circulation factors in K-12 facilities has been developed by Fanning/Howey Associates Inc. which has offices in Florida, Ohio, Indiana, Michigan, Pennsylvania, Kentucky, and Virginia.
- The recommendation percentage for circulation and construction is based on analysis of 97 schools constructed in the past four years.
- Conclusion:** The suggested amount of space to be allocated for construction and circulation should be 35%.

# **Montgomery County Public Schools**

## **High Schools**

Suggested Space Requirement Standards  
and  
Capacity Size Standards

***Adopted  
February 8, 2000***

DeJong & Associates, Inc.

## Workshop Participants

**October 29, 1999**

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# Introduction

The purpose of this document is to provide suggested program space standards and capacity criteria for the Montgomery County Public Schools.

The proposed standards enclosed are an update of the standards developed in 1995. These standards take into consideration current programs and services, draft guidelines developed by the Virginia Department of Education, recommendations from the Council of Educational Facility Planners, International [CEFPI], and information derived from various states and non-profit organizations.

The standards established for Montgomery County Public Schools must meet the student and programmatic needs that exist. These standards should be used as a guide for planning, designing, and evaluating school facilities. These standards should also be used in helping understand future renovations, additions, and new construction that may be needed.

# High School Standards

The attached suggested standards are based on the following criteria:

**Grade Configuration:** 9 - 12

**School Size:** 600 - 1,200 Students

**Student/Classroom Ratio:**

20/1

22:1 final decision

**Site Size:**

Minimum 35 Useable Acres Plus 1 Acre Per 100 Students

# High School Size

As Montgomery County Public Schools develops a long-range facility plan, the optimum size of schools will be important to determine.

Research on this topic often associates small with rural schools and large with urban schools. This is not always the case. Furthermore, there are a wide variety of definitions of what is small and what is large. In a suburban area, such as Montgomery County, a high school of 1,200 students would be classified as a large high school. In an urban area, such as Chicago, Phoenix, or Atlanta, a 1,200-student high school would be defined as small.

Even within Montgomery County Public Schools there is a wide definition of large and small to Shawsville and Auburn a high school for 700 students would be classified as large but for Blacksburg and Christiansburg 700 students would be a small high school.

Even though there is a great amount of debate on this topic, in general, research would indicate the following:

<u>Variable</u>	<u>Favor Large or Small School</u>
<b>Academic Achievement</b> [Several recent studies favor small schools, especially for low SES students.]	Smaller Schools
<b>Parent Involvement</b> [PTA, volunteers, tutoring, fund-raising, etc.]	Smaller Schools
<b>Educational Opportunities</b> [choice, more diverse program offerings, multiple foreign languages, advanced placement programs, etc.]	Larger Schools
<b>Cost Effectiveness</b> [more students to average overhead costs, e.g. media specialists, principals, secretaries, food service, athletics, etc.]	Larger Schools
<b>Sports/Athletics/Competition</b> [win more games, awards at band concerts, etc.]	Larger Schools
<b>Student Participation</b> [greater percentage can be on varsity teams, leadership in band, clubs]	Smaller Schools
<b>Discipline</b> [greater sense of belonging, easier to "control"]	Smaller Schools

There is a wide range of literature supporting different school sizes. Certain educators like John Goodlad and TedSizer have been advocating smaller high schools [500-600]. Other research developed by Carroll McGuffy from Georgia has identified 1200-1800 students as the size that provides the most diversified program in the most cost-effective manner.



## High School Size

What is evident is that most small schools are trying to figure out how to become bigger and large schools are trying to figure out how to become smaller. Nationally, high schools are in a state of change. Historically, high schools have been organized by department. Evolving today are a wide variety of teaming arrangements, new scheduling techniques, such as block schedules, and other types of arrangements, such as magnet schools and schools-within-a-school.

From an organizational perspective, high schools today should be developed with more flexibility to accommodate a variety of educational delivery systems, such as departmentalization, grade level teams, schools-within-a-school, etc. A high school for 1,200 students might be organized academically into four 300-student schools-within-a-school, thus maximizing both the positive characteristics of smallness and largeness.

These new organizational structures at the high school level lend themselves to a new way of organizing a building. Newer high schools and high school renovation projects are being organized in houses, academies or clusters arrangements. This allows for the decentralization of administrative and counseling services and a greater sense of belonging for students. These approaches attempt to maximize the advantages of smallness and largeness.

Cost effectiveness is another factor to consider. High schools with an enrollment of 500 and lower tend to pay a high cost for fewer available programs. Research shows that as high school size increases, per capita cost is decreased and program offerings increase. As school size increases and costs are held constant:

- a. Teachers hold higher degrees
- b. Students taught by teachers teaching out-of-field decrease
- c. Average number of courses increase
- d. Average number of subjects increase

A 1993 study showed that highest achievement [on three standardized tests] came from high schools with 495-1,200 students. Another study of school district size found that 12<sup>th</sup> grade achievement improved up to 1,200-1,600 students, then the relationship between size and achievement shifts from positive to negative. This is a reverse situation from elementary schools, where smaller schools produced greater achievement.

Studies also show that secondary schools with enrollment higher than 1,500 appear to have an adverse impact on job satisfaction and job stress on some teachers.

**Conclusion:** Suggested size of a high school is 700-1,200 students.

# High School Site

**Site Size:** Minimum 35 Useable Acres Plus 1 Acre Per 100 Students

School site requirements for Montgomery County Public Schools are as follows:

<b>High School Site Space Requirements for 600 Students</b>	<b>Approximate Size [sq. ft.]</b>	<b>Acres</b>
<b>Building Footprint</b>	100,000	2.29
<b>Parking and Drives</b>	125,000	2.87
<b>Outdoor Physical Education Athletics:</b> <ul style="list-style-type: none"> <li>• One eight-lane running track with field events</li> <li>• One practice football field</li> <li>• One practice soccer field</li> <li>• Two multi-purpose fields</li> <li>• Two softball fields</li> <li>• One baseball field</li> <li>• Eight tennis courts</li> <li>• Four basketball courts</li> </ul>	900,000	20.64
<b>Outdoor Learning Area</b>	5,000	0.11
<b>Stadium</b>	<del>100,000</del> 1,000,000	2.29
<b>Subtotal</b>	1,230,000	28.21
<b>Add 30% Greenspace</b>	369,000	8.46
<b>Grand Total</b>	1,599,000	36.67

# High School Site

High School Site Space Requirements for 1200 Students	Approximate Size [sq. ft.]	Acres
Building Footprint	180,000	4.13
Parking and Drives	180,000	4.13
<b>Outdoor Physical Education Athletics:</b> <ul style="list-style-type: none"> <li>• One eight-lane running track with field events</li> <li>• One practice football field</li> <li>• One practice soccer field</li> <li>• Two multi-purpose fields</li> <li>• Three softball fields</li> <li>• Two baseball fields</li> <li>• Ten tennis courts</li> <li>• Six basketball courts</li> </ul>	1,050,000	24.08
Outdoor Learning Area	7,000	0.16
Stadium	125,000	2.87
Subtotal	1,542,000	35.36
Add 30% Greenspace	462,600	10.61
<b>Grand Total</b>	<b>2,004,600</b>	<b>45.97</b>

The following are suggestions for safety and security:

- use high trees and low bushes [less than three feet high] to deter hiding
- use aesthetically pleasing fencing around perimeter of the building
- place some buildings or a tree buffer along the perimeter of the property to avoid extensive fencing
- non-intrusive lighting of all areas [not correctional-type lighting]
- provide security lighting around building and parking lots with photocell timer with on/off capacity
- separate athletic fields and informal gathering areas
- locate athletic facilities away from building
- recess building on site to avoid vehicular and pedestrian conflicts

## Commentary:

The high school site is as important to education as the building itself. The outside aspects of the location affect students, staff, parents, and community members. Safety is a major concern, as is the most effective use of available space. Aesthetics and attractiveness of the site are also important.

# High School Site

## Commentary:

Increasingly, school sites are being used for community recreation purposes. Furthermore, off-street bus loading, increased parking demands, and attempts to separate buses, vehicular traffic and pedestrian access to buildings are causing the need for larger school sites.

## References:

The State of Virginia, in their draft standards, recommends a minimum site size of ten acres plus one acre per 100 students. Using these standards, a high school of 1000 students would equate to 20 acres.

The Council of Educational Facility Planners, International [CEFPI] recommends 35 acres plus one acre per 100 students. CEFPI standards of a 1000-student high school would yield 45 acres.

The Virginia Department of Education states the following guidelines for minimum outside physical education instruction areas.

Size (in feet)	Area	600 students	1200 students
100 X 120	Hard Surface/Basketball Courts	1	2
100 X 180	Fitness Development Equipment Area	1	1
200 X 590	Track (standard size)	1	1
200 X 1400	Field Games Area	2	3
7200 SF	Tennis Courts (60 X 120 each)	6	6

The Virginia Department of Education states that "driveways and service drives shall not encircle the school, nor serve as pedestrian walks. Bus loading areas shall be separated from other vehicular traffic."

## Conclusion:

The recommended high school site size standards is 35 useable acres plus one acre per 100 students. For a maximum enrollment of 600 students, 41 acres would be needed. A school enrollment of 1200 would require 47 acres. If this site is to be used for community/recreation purposes, a larger site should be considered.

**Montgomery County Public Schools**

**Suggested  
Space Requirement  
Standards**

# Space Program Standards

**High School Size:** 600 - 1200 students

**Student/Classroom Ratio:** 20/1

Program Area		Recommended Standard Square Feet
Core Classroom		800-850
Science Room		1,200-1,400
Specialized Living Labs		800-900
Resource Room		400
Health Classroom		800-850
Art Room: 2-D		1,200
Art Room: 3-D		1,200
Choral Room		1,400-1,600
Band Room		2,000-2,400
Music Classroom		800-900
Business Classroom		1,200
Piano Lab		800
Work and Family Studies		1,500
Technology Lab		4,000
Computer Lab		1,000
Foreign Language Classroom		800-850
Drama Classroom		1,200
Library/Media Center		7,000
Reading Room	3,500	
Multi-Media Production		
Classroom		
Workroom		
Office		
Technology Head-End Room		
Storage		
Conference Room		
Gymnasium		15,000
Auxiliary Gymnasium		7,000
Auditorium		15,500
Seating	9,000	
Storage	3,500	
Support Area	3,000	

## Space Program Standards

Program Area		Recommended Standard Square Feet
Cafeteria		8,000
Dining	5,000	
Food Service	3,000	
Administration and Guidance Spaces		5,500
Reception Area		
Secretarial Work Area		
Principal's Office		
Assistant Principal's Offices		
Secretary's Office		
Conference Room		
Mail/Work/Copy Room		
Storage		
Vault		
Restrooms		
Guidance Waiting Area		
Guidance Offices		
Career Center		
Conference Room		
Guidance Records		
Health Unit		
Attendance Office		
Itinerant Offices		
Teacher Prep Centers [multiple]		300-600

## Core Classroom

**Size:** 800-850 SF

**Commentary:** A typical classroom accommodates 20 students, along with appropriate furniture, equipment, and storage. High school instructional designs include large-group, small group, and independent activities. Hands-on and interactive activities, research, group problem solving, integration of technology, and project-based learning require flexibility of movement in the room. Additionally, classroom furnishings often include tables rather than individual desks.

The adoption of an inclusion model for serving disabled students creates a need for space to accommodate more adults per classroom, wheelchairs, and other assistive devices.

The integration of technology creates needs for approximately 150-200 sq. ft. to accommodate 6 to 8 computer stations.

**References:** CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 34, recommends 800 square feet as ideal and 700 square feet as acceptable for a high school classroom.

The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends 700 square feet for a high school classroom.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 9, states an area of 900 square feet for 30 students.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 750 square feet.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 720 square feet.

The FUSS Study recommended 650-700 square feet.

**Conclusion:** The suggested area is 800-850 square feet.



# Science Room

**Size:** 1,200-1,400 SF

**Commentary:** Hands-on activities, experiments, small group work, project work, data collection, and analysis are typical of the activities that need support and adequate space to ensure safety. A demonstration bench/table should be strategically placed for student viewing.

Additional space is needed for science preparation, an eye wash fountain, emergency shower, and chemical storage.

**References:** CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 39, recommends 1,200 square feet as ideal and 1,080 square feet as acceptable for a science classroom to accommodate 24 students, furniture, equipment, and flexible use of space.

The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends a minimum of 45 square feet per student in a combined laboratory/classroom, and 35 square feet per student in a separate laboratory or classroom.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 9, states a minimum area of 1,200 square feet for a science laboratory.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 1,000 square feet.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 1,200 square feet for 20 students.

The FUSS Study recommended 1,260-1,400 square feet.

**Conclusion:** The suggested area is 1,200-1,400 square feet, plus storage and preparation area.

# Specialized Living Labs

**Size:** 800-900 SF

**Commentary:** Special education students require more area per student than regular classroom students do. Special education classrooms need to be able to accommodate students with a variety of physical and mental handicaps. Instruction is usually delivered to meet the individual needs of students, but is also delivered to small groups. Activities include listening skills, life skills, coping skills, presentations, computer skills, art, and music. A separate area, or access to an area, for functional living instruction [cooking, housekeeping, etc.] is suggested.

In addition to classroom space, tutoring and other resource areas are also needed. Since there is an increased emphasis on placing special needs students in the regular classroom, it is suggested that this room have the flexibility to be used as a regular classroom or as a special education room.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends 750 square feet for 10 students.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal* (None given)

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 5, states 30 square feet for each student or a minimum of 900 square feet for a special education area.

The Ohio School Facilities Commission's *Ohio School Design Manual*, 1999, recommends 900 square feet.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 825 square feet for each program. The equivalent area for each program is 825 square feet.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 720 square feet for 12 students.

**Conclusion:** The recommended area is 800-900 square feet

## Resource Room

**Size:** 400 SF

**Commentary:** Special needs students [special education, at-risk, gifted, etc.] need a variety of space rather than a traditional classroom. This variety would include a multi-purpose area for small group instruction and differentiation. Adjoining rooms should accompany this area so that appropriate supervision can be provided and concurrent activities can take place. These adjoining areas will be used for activities such as individual or small group testing, cooling off [time out] area, individual therapies, [PT/OT, music, counseling, etc.] and to meet students' toiletry/personal hygiene needs. A shower/bath should be installed in this area.

Special Education teachers need a small area to prepare for class instruction and to store educational materials as well as personal belongings. This space could accommodate itinerant teachers that often have to place for their materials and personal possessions.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends 750 square feet for 10 students.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal* (None given)

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 5, states 30 square feet for each student or a minimum of 900 square feet for a special education area.

The Ohio School Facilities Commission's *Ohio School Design Manual*, 1999, recommends 900 square feet.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 825 square feet for each program. The equivalent area for each program is 825 square feet.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 720 square feet for 12 students.

**Conclusion:** The suggested area is 400 square feet. There should be six Resource Rooms or one per 100 students, whichever is greater.

# Health Classroom

**Size:** 800-850 SF

**Commentary:** A health classroom will be used as part of the Physical Education curriculum. The classroom will be used for instruction of the cognitive aspects of Physical Education. The classroom also should be flexible enough to be used as a core classroom, if necessary.

Often, if classes are combined and form groups of 40-50 students, it is suggested that two health classrooms be located adjacent to each other with a moveable wall in between. This would allow for two separate classes or one combined class. The larger space could also be used for team meetings.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends 700 square feet for a high school classroom.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 39, recommends 750 square feet as ideal and 625 square feet as acceptable for a health classroom to accommodate 25 students, furniture, equipment, and flexible use of space.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities (None given)

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 1,100 square feet for 15 students.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 850 square feet for 25 students.

**Conclusion:** The suggested area is 800-850 square feet.

# Art Room

**Size:** 1,200 SF

**Commentary:** The high school art room should be large enough to accommodate a variety of art instruction, including drawing, painting, computer graphics, sculpture and model making, collage, fiber arts, and ceramics. In addition to art projects, the room must accommodate appropriate storage and a cleanup area. Adequate design should be considered for traffic flow, and space should be planned for special furniture and equipment such as easels, potters' wheels, and computer stations. Space for student art display must be considered if it is to be placed inside the classroom.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends 45 square feet per student, not including storage and kiln rooms.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 39, recommends 1,250 square feet as ideal and 1,125 square feet as acceptable for a visual arts classroom to accommodate 25 students, furniture, equipment, and flexible use of space.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 9, states that each school should have an art area of 50 square feet per student.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 1,200 square feet.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 1,200 square feet for 25 students.

The FUSS Study recommended 1,200 square feet.

**Conclusion:** The suggested area is 1,200 square feet plus 180 square feet for a kiln and storage.

# Choral Room

**Size:** 1,400-1,600 SF

**Commentary:** Choir requires freedom of movement, as the program involves rehearsals for various sizes and types of vocal music groups, which could include choreography. Adequate space for risers, music stands, piano, chairs, and computer stations is needed within the choir room. Some vocal music classes can include up to 60 students.

In addition to the choral room, there is a need for storage, office space, music library, and practice rooms.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, states the choral room shall be at least 15 square feet per member of the largest choral group.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 39, recommends 2,100 square feet as ideal and 1,800 square feet as acceptable for a choir room to accommodate 60 students, furniture, equipment, and flexible use of space.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 9, states an area of 16 square feet per student is required. The equivalent area for 60 students is 960 square feet. At least 1 music room should have a minimum of 1,200 square feet.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 900 square feet for each program.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 1,000 square feet for 40 students. The equivalent area for 60 students is 1,500 square feet.

The FUSS Study recommended 1,100-1,200 square feet.

**Conclusion:** The suggested area is 1,400-1,600 square feet.

## Band Room

**Size:** 2,000-2,400 SF

**Commentary:** Band requires freedom of movement, as the program involves playing musical instruments. Adequate space for music stands, piano, chairs, and computer stations is needed within the band room. Traffic flow must also be considered as students are moving in and out of the room with instruments of various sizes.

In addition to the band room, there is a need for storage, office space, music library, and practice rooms.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, states the band room shall be at least 20 square feet per member of the largest band group.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 39, recommends 2,000 minimum square feet as acceptable for a band room to accommodate students, furniture, equipment, and flexible use of space.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 9, states an area of 20 square feet per student is required. The equivalent area for 60 students is 1,200 square feet.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 2,500 square feet for each program.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 2,000 square feet.

The FUSS Study recommended 1,800-2,000 square feet plus storage and support areas.

**Conclusion:** The suggested area is 2,000-2,400 square feet plus practice rooms – three at 40 square feet and 2 at 80 square feet each.

## Business Areas

**Size:** 1,200 SF

**Commentary:** This classroom will provide a space for instruction in courses offered in the business curriculum. There must be space for computers for instruction in word processing, multi-media, computer applications, and computer accounting classes.

In a school for more than 1000 students, the equivalent of three rooms, or 3,000 SF, is needed. For a school of 500 students, the equivalent of two rooms, or 2,000 SF, is needed.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends 30 square feet per student, not including storage areas.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal* (None given)

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 9, states an area of 1,000 square feet for 25 students but at least 1 room with 1,200 square feet should be provided in business education.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 1,260 square feet for 28 students.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 950 square feet for 20 students.

The FUSS Study recommended 1,200 square feet.

**Conclusion:** The suggested area is 1,200 square feet.



## Computer Lab

**Size:** 1,000 SF

**Commentary:** This area will provide a space for the entire school community to use. There must be space for computers for instruction in word processing, multi-media, computer applications, and computer accounting classes. However, this will not specifically be a business curriculum-related area; any subject or department [English, math, PE, etc.] will be able to use computer labs.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends 30 square feet per student, not including storage areas.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal* (None given)

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 9, states an area of 1,000 square feet for 25 students but at least 1 room with 1,200 square feet should be provided in business education.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 1,260 square feet for 28 students.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 950 square feet for 20 students.

The FUSS Study recommended 1,200 square feet.

**Conclusion:** The suggested area is 1,000 square feet.

# Work and Family Studies

**Size:** 1,500 SF

**Commentary:** The room must accommodate appropriate storage cabinets and counter space in each area, in addition to food preparation equipment such as ovens, stoves, refrigerators, microwaves, and sinks.

Space for a demonstration area should also be considered in the classroom.

This space is designed to serve a changing "home economics" program. The "home economics" program has changed to "work and family life." Life skills include education of foods, sewing, parenting, personal hygiene, household budgeting, etc.

Some schools may have a child care area in addition to the above.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, has no recommendations.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 42, recommends 1,250 square feet as ideal and 1,000 square feet as acceptable for a foods lab to accommodate 25 students, furniture, equipment, and flexible use of space.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 9, states an area of 3,000 square feet for a home economics program when taught by a single teacher.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 2,400 square feet for a home economics unit area where one teacher is provided.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 950 square feet for 25 students.

The FUSS Study recommended 1,500 square feet.

**Conclusion:** The suggested area is 1,500 square feet.

# Technology Lab

**Size:** 4,000 SF

**Commentary:** This area might include classroom space, a clean area, modular area, dust-free area [with computers], storage [for lumber and large pieces of equipment], and office space.

The classroom/lab should be large enough to accommodate a variety of instruction and experiments including robotics, electronics, thermodynamics, research, and design, and desktop publishing. In addition to modular arrangement, the classroom must accommodate appropriate storage and a cleanup area. Adequate design should be considered for traffic flow, and space should be planned for special furniture and technical equipment such as wind tunnels and computer stations.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, has no recommendations.

CEFPI's Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal* (None given)

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 9, states an area of 2,400 square feet shall be provided for a technology education laboratory.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 1,600 square feet for a modular technology lab.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C (None given)

The FUSS Study recommended a Technology Lab of 1,900-2,100 square feet plus a 2,000 SF Production Shop.

**Conclusion:** The suggested area is 4,000 square feet.

# Production Lab

## Commentary:

The production lab is a name given to what could be a variety of shops:

- metal shop
- wood shop
- vo-ag shop
- drafting
- auto-mechanics
- electronics
- machine technology
- graphics
- cosmetology
- agriculture
- building trades
- nursing
- marketing

The exact configuration of these labs will need to be determined. The size of the school will have a significant impact on the number and types of labs required. Furthermore, these areas of instruction are going through significant change as the economy has changed.

A production lab should be large enough to accommodate instruction of using tools and materials to fabricate projects.

Adequate space must be given between workstations to ensure safety in handling power tools and equipment.

Adequate design should be considered for traffic flow, and space should be planned for specific tools and student work/project tables.

## Conclusion:

Specific sizes for each of these areas will have to be determined.

The district will do a study on vocational requirements to determine actual program and space requirements

## Library/Media Center – Reading Room

**Size:** Reading Room – 3,500 SF; Total Area – 7,000 SF

**Commentary:** The reading room/circulation area houses shelving for books, tables, computer stations, and comfortable seating, in addition to the check-out desk area. It should be a comfortable, inviting, and quiet area.

Students may study, read, do research, check out materials, or work in small groups.

Usually the number of books or volumes, in a reading room is directly proportional to the student capacity.

Many library planners and the requirement for school accreditation require the library to accommodate 10% of the students.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends a gross floor area of at least 1,000 square feet, plus three square feet times the total enrollment. For a school of 1,000 students, the formula would yield 4,000 square feet.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 39, recommends 30 square feet as acceptable for a library to accommodate 15 percent of the enrollment, furniture, equipment, and flexible use of space.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 9, states that sufficient area for 10 percent of the student body at 25 square feet per student should be provided.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 1,820 square feet for a 900-student capacity.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 2,000 square feet for an capacity of 500 students.

The FUSS Study recommended a Reading Room of 3,400-4,000 square feet and the total library of 5,300-6,000 SF.

**Conclusion:** The room is to accommodate 10% of the student capacity. The allowance of 35 square feet per student is adequate space for students, books, and shelving plus 3500 square feet for support areas.

# Gymnasium

**Size:** 7,000 SF Plus Seating

**Commentary:** This space, in addition to being a physical education space, provides for a spectator gym for extra curricular activities such as basketball, volleyball, and other athletic activities. It may also be used for assemblies and community use. The basketball court in a high school gym should be 84' x 50' with a recommended 5' clearance on each side.

Bleachers should accommodate  $1\frac{1}{2}$  times the entire student body. For a school of 500 students, this would be 750 seats; for a school of 1,000 students, this would be 1500 seats.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, states the gymnasium should be 62' X 100' X 22' with clear height. This does not include provisions for bleachers

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal* (None given)

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 9, states an indoor physical education facility should have a minimum floor space of 10,000 square feet, exclusive of safety lanes.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 8,175 square feet for a 450-student capacity.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 9,000 square feet for a 500-student capacity.

The FUSS Study recommended 10,000 SF.

**Conclusion:** The suggested area is 7,000 square feet. An additional four square feet per seat should be added plus support spaces. For a school of 1,000 students it is suggested that there be up to 1500 seats, the total area would be 13,000 square feet.

## Auxiliary Gymnasium

**Size:** 7,000 SF

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, states the gymnasium should be 62' X 50' X 22' with clear height.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal* (None given)

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities (None given)

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995 (None given)

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, (None given)

The FUSS Study recommended 4,000 SF.

**Conclusion:** The suggested area is 7,000 square feet.

## Food Service

**Size:** 3,000 SF

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends the minimum total area of the general kitchen shall be provided in accordance with the following formula: 1,000 square feet, plus one square foot times the total enrollment. A 1,000-student school would yield 2,000 square feet.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 43, recommends 2 square feet per meal served as acceptable for a kitchen. (Area for the entire food service is not given.)

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Buildings (None given)

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 1,580 square feet for 300- to 599-student capacity.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 2,430 square feet for 500-student capacity.

The FUSS Study recommended 3,100-3,600 SF.

**Conclusion:** The suggested area is 3,000 square feet. The suggested area is four square feet multiplied by the number of students.



# Student Dining

**Size:** 5,000 SF

**Commentary:** The design of an auditoria offers flexibility of usage for student dining as well as performances, and therefore saves square footage. The space is flexible and can be arranged with dining tables/chairs for meals, or the tables can be stored and the area can be set up with seating for performances. The floor can be designed in flat tiers for dining and better viewing for performances.

A faculty dining room should be accessible from the student dining area. There could possibly be self-service serving/buffet lines with direct access to the kitchen.

**References:** CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, page 43, recommends 10 to 14 square feet per seated student. Page 39 recommends an auditorium audience space of 10 to 12 square feet per seat.

The State of Virginia draft regulation for Public School Building Construction, dated 1994, recommends the minimum gross floor area of 12 square feet times one-third the total enrollment.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities, Section 5, states an area of 12 square feet per student to be seated at any one time should be provided for a multi-use area such as eating, and large group activities.

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states a minimum cafeteria unit area of 3,000 square feet for 300 to 599 students.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 2,000 square feet for a 500-student capacity dining area.

**Conclusion:** For a school with 1000 students the suggested area is 5,000 SF, based on 15 square feet per seat multiplied by one-third of the student population, is recognized as the area required for tables, chairs, and circulation within the space.

# Auditorium

**Size:** 15,500 SF

**Commentary:** The auditorium size should accommodate the entire student body at one time. However, for a school in excess of 1,000 students, seating the entire student body is not realistic.

The formula is nine square feet per seat plus stage area and support areas.

9 SF per seat X 1000	9,000
Stage	3,500
Support Areas	<u>3,000</u>
Total	15,500

**Resources:** No guidelines are given for auditorium size.

The FUSS Study recommended 13,000-15,000 SF.

**Conclusion:** The suggested area is 15,500 square feet.

## Administrative and Guidance Spaces

**Size:** 5,500 SF

**Commentary:** This area includes the administrative functions of the school combined with student support services. It serves as the coordinating role of the high school, including overall instructional leadership, a safe productive learning environment, and building management. This area includes space for offices, reception area, guidance, secretary work areas, attendance, and other support functions of the school.

There are no clear guidelines regarding the placement of the guidance department. Some guidelines include guidance offices, and some do not.

Program and design considerations will need to address if these areas are located in one location or if they are spread throughout the building.

**References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, makes no recommendations.

CEFPI's (Council of Educational Facility Planners International) 1992 *Guide for School Facility Appraisal*, pages 44 and 45, recommends 2,830 square feet as acceptable for an administrative area for a school of 500 students.

*Indiana State Board of Education School Facility Guidelines*, adopted September 7, 1995, Section Guidelines for Conventional School Facilities (None given)

*Kentucky Facility Programming and Construction Criteria*, effective date March 2, 1995, states an area of 1,720 square feet for 300- to 599-student capacity.

*West Virginia Guidelines & Procedures Handbook*, School Building Authority dated July 1996, Appendix C, states 2,505 square feet for 500-student capacity.

The FUSS Study recommended 4,800-6,000 SF.

**Conclusion:** The suggested area is 5,500 square feet.

## Teacher Prep Area/Workroom

**Size:** 300-600 SF

**Commentary:** Teachers and other staff members require a space where team meetings and class preparation can take place. The room should provide certain features that facilitate professional interaction, thus improving communication, professional development, and team building.

Teachers need dedicated space to prepare for classroom instruction, meet with other teachers, and hold parent conferences. This area should be separate from, but near the classroom.

The room should accommodate tables and chairs for meeting and workspace as well as storage for instructional materials.

**References:** There were no state guidelines for this area.

The FUSS Study recommended two [450 SF] areas.

**Conclusion:** There are several ways in which the necessary teacher space may be configured. Typically, these are planning areas that vary from 250-450 SF and are located throughout the building.

The suggested area for teacher prep areas should be 300 square feet, plus storage space, and located in the various academic areas of the building. This is based on 50 SF per teacher.

**Montgomery County Public Schools**

**Capacity Size  
Standards**

# Capacity Size Standards

## Determining High School Capacity

High schools operate on a totally different basis than elementary and middle schools. Students are not in self-contained environments occasionally traveling to another location for a special class. At the high school level, students typically change classes each period.

High schools are undergoing significant change in program delivery. Many schools are adopting block scheduling and/or various teaming approaches. The method for calculating capacity at the high school level needs to be flexible to deliver a traditional departmentalized program or the newer evolving methods of program delivery.

## Average Class Size

There is currently a wide range of class sizes in a high school and from school to school. It is not uncommon to find some very small classes in advanced placement courses and upper level foreign languages. At the same time it is not uncommon to find 60 or more students in a band or choir class.

Several states have attempted to determine the capacity of a building by establishing a capacity for each type of room in a building. This may be an appropriate approach but often results in a much larger capacity than what is realistic. For example the band room may be rated as a capacity for 75 students. The fact of the matter is that the full band only meets one period per day and the rest of the day the room is being used for smaller sectional or specialized bands such as a jazz band. To say that the capacity of the band room is 75 assumes that the room is used every period of the day for that number of students. In reality, the band room may be used for 75 students one period per day and less than 20 students each of the remaining periods, or the room may only be used as a band room 3-4 periods per day.

Even though this seems like an over simplification, using an average class size of 20 students [which is the goal of Montgomery County Public Schools] across the board has worked quiet well in determining capacity at the high school level.

## Teaching Stations/Classrooms

Teaching stations are defined as areas in which students receive instruction in core curriculum courses as well as exploratory/elective curriculum areas. These areas should be adequately sized to meet the needs of the programs included in the space. Program areas include English, math, social studies, foreign language, science, art, music, family and consumer science, business, vocational/technology education, and physical education. In a high school the gym should be counted as one or more teaching stations. Even though it is not a regular classroom, it is a location in which students receive instruction on a hourly/daily base. Likewise, a food lab, science lab, business computer lab, and vocational/technology lab are all counted as teaching stations.

Auditoriums and library/media centers are not counted as teaching stations since these spaces are not assigned for "regular" instruction.

# Capacity Size Standards

## Utilization Factor

It is very difficult to schedule every teaching station every period of the day. There may be a specialized space, such as a vocational/technical lab, for which there is insufficient enrollment to conduct classes each period. At times, it is advisable for the classroom to be available to the teacher during a teacher's prep period. At other times it is just not possible to maintain an average enrollment of ~~20~~ <sup>22</sup> students and there needs to be some room to adjust.

It is recommended that the utilization factor of 85% be used at the high school level. This would represent approximate utilization of five out six periods in a six period day or six out of seven periods in a seven period day. This may indicate that some spaces are being used more than 85% of the time whereas others may be used less.

Block scheduling provides another dilemma. There are a variety of block schedules but many are based on a four 90-minute period day. Some of the time it is the same four periods every day. At other times it is four periods on alternating days. Arguments have been made to reduce the utilization to 75%, which would represent three out of four periods per day. On the surface 75% may seem logical but it is not efficient use of space. This would mean that 25% of classroom space would be idle at any one time.

Using the 85% factor in a school that utilizes a block schedule would mean that a room would be available on period every other day on the alternating block schedule. Or that approximately half of the rooms would be utilized 100% and the other half would be utilized 75% on the schools that have the same four periods every day.

Experience has shown that if the 85% factor is used for planning purposes, the high school has the ability to increase the utilization to 90% or higher in the event of short-term overcrowding issues. Experience will also show that once a building surpasses 90% utilization, scheduling of spaces and students becomes increasingly difficult.

If space is going to be used less than 50% of the time, consideration should be given to reusing the space for another purpose or determining some type of multi-use of the space to increase its utilization.

## High School Functional Capacity Formula:

In the past, capacity was determined by counting the number of teaching stations in a facility and multiplying by an average class size. In facility planning terminology this is called the "design" capacity of the building. However, this methodology does not take into account programmatic implications. By applying the utilization factor to the design capacity, the functional capacity can be obtained. An example is included below.

$$\begin{array}{rcl} \text{\# of Teaching Stations} & & 40 \\ \text{Average \# of Students} & \times & \underline{20} \quad 22 \\ & & 800 \end{array} \quad \times 85\% = 680 \text{ Capacity}$$

This would be a very straightforward method of determining capacity, just count the total number of teaching stations, multiply by ~~20~~ <sup>22</sup> students and multiply 85%.

# Building Circulation and Construction

- Size:** 35% of total space to be allocated for construction and circulation.
- Commentary:** Constructing a building includes more than classrooms, gymnasiums, and program spaces. A building also includes circulation spaces and construction factors such as wall thickness. This includes hallways, locker areas, vestibules, etc.
- References:** The State of Virginia draft regulation for Public School Building Construction, dated 1994, does not include recommendations or circulation and construction.
- The most comprehensive analysis of programming circulation factors in K-12 facilities has been developed by Fanning/Howey Associates Inc. which has offices in Florida, Ohio, Indiana, Michigan, Pennsylvania, Kentucky, and Virginia.
- The recommendation percentage for circulation and construction is based on analysis of 97 schools constructed in the past four years.
- Conclusion:** The suggested amount of space to be allocated for construction and circulation should be 35%.