

4-1 GENERAL

This chapter describes individual staff, academic, vocational training and support spaces needed to accommodate the typical functions of ACES Centers. Functional uses and adjacency relationships are described; occupant loads and space allocations are identified; and typical functional layouts are provided. Space allocations and layouts are based on 5-foot modular dimensioning discussed in Chapter 3 under Functional Layout. At the end of the chapter is a summary of environmental support criteria applicable to each space.

4-2 STAFF SPACES

Staff spaces include offices for the director, administrators, clerks, typists, registrar and counselors.

a. DIRECTOR'S OFFICE

Use	For the Director who oversees the ACES Center operation and holds frequent conferences with staff and visitors.
Occupant Load	1 staff
Space allocation	200 NASF
Adjacency relationships	Locate adjacent to Clerks, Typists and Administrators with indirect but unobstructed access to Counselors.
Layout	See Figure 4-1.

- 1. Director's Desk and Chair
- 2. Bookcase credenza
- 3. File cabinet
- 4. Visitor chair

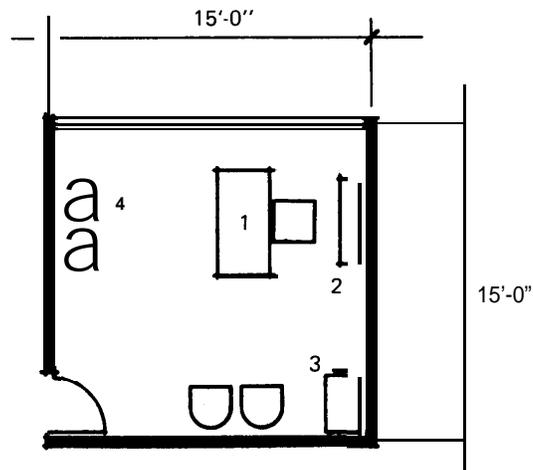


Figure 4-1 Director's Office

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4-2 STAFF SPACES (cont'd)

b. ADMINISTRATOR OFFICES

Use	For Administrators who oversee various segments of the instructional program and hold frequent conferences with contracted instructors and staff.
Occupant load	1 staff per office
Space allocation	Offices 150 NASF per administrator
Adjacency relationships	Locate Administrators near the Director's Office
Layout	See Figure 4-2

- 1. Administrator's desk and chair
- 2. Bookcase or credenza
- 3. File cabinet
- 4. Visitor chair
- 5. Chalk/tack surface

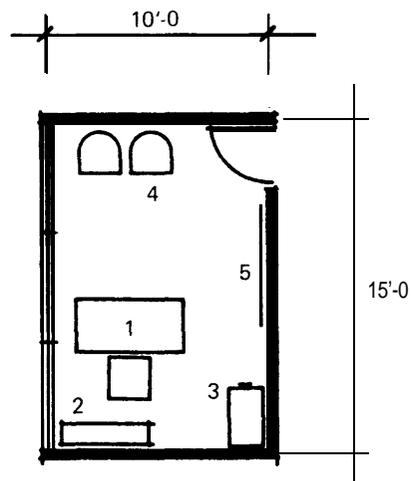


Figure 4-2 Administrator's Office

4-2 STAFF SPACES (cont'd)

c. INFORMATION/REGISTRATION/CLERK/TYPIST SPACE

Use	For Clerks who assist in administrative matters such as procurement, funds control, and in keeping of records; for Typists who provide typing and secretarial services for the entire staff; and for the Registrar who provides registration and information services. A contiguous space is required for visitor/student information. Also a separate space is required for storage of office forms and equipment.	
Occupant load	1 staff per office	
Space allocation	Offices	100 NASF per Clerk 75 NASF per Typist
	Registrar	100 NASF
	Information/Reg.	150 SF (min)
	Storage	75 SF (min)
Adjacency relationships	Locate Clerk/Typist spaces adjacent to Director/Administrator Offices. Locate Registrar and Information spaces adjacent to the main entrance for visitor convenience and visual control. Storage should be adjacent although it may be segmented to other parts of the facility where needs for this type of storage exist. Easy access should also be available to Training Aids Preparation and the Receiving Room.	
Layout	See Figure 4-3.	

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4-2 STAFF SPACES (cont'd)

- | | |
|---------------------------|--|
| 1. Typist Desk and Chair | 7. Registrar's Desk and Chair |
| 2. Typing Credenza | 8. Counter w/computer terminal or file |
| 3. File Cabinet | 9. Counter Chairs |
| 4. Bookcase | 10. Tack surface or Notice Board |
| 5. Clerk's Desk and Chair | 11. Display and Trophy Cabinet |
| 6. Visitor Chair | 12. Shelving |

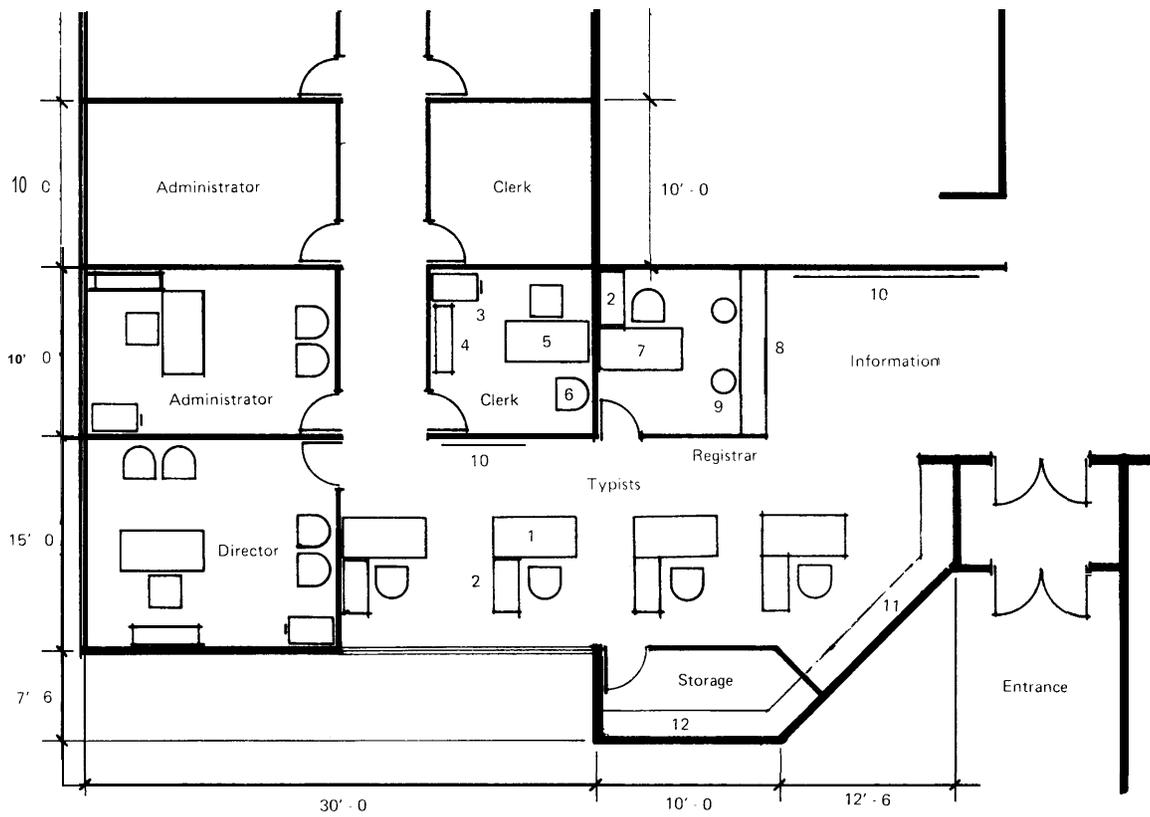


Figure 4-3 Information/Registration/Clerk/Typist Space

4-2 STAFF SPACES (cont'd)

d. COUNSELOR OFFICES

Use	For Counselors who assist personnel develop effective continuing education plans. A separate space for reference and conference is normally required.
Occupant load	1 staff per office
Space allocation	Offices 100 NASF per counselor; 1 to 10 75 NASF per counselor; 11 and above
Adjacency Relationships	Locate Counselors near the Information/Registration space with indirect but unobstructed access to the Director's Office. Reference room should be adjacent.
Layout	See Figure 4-4.

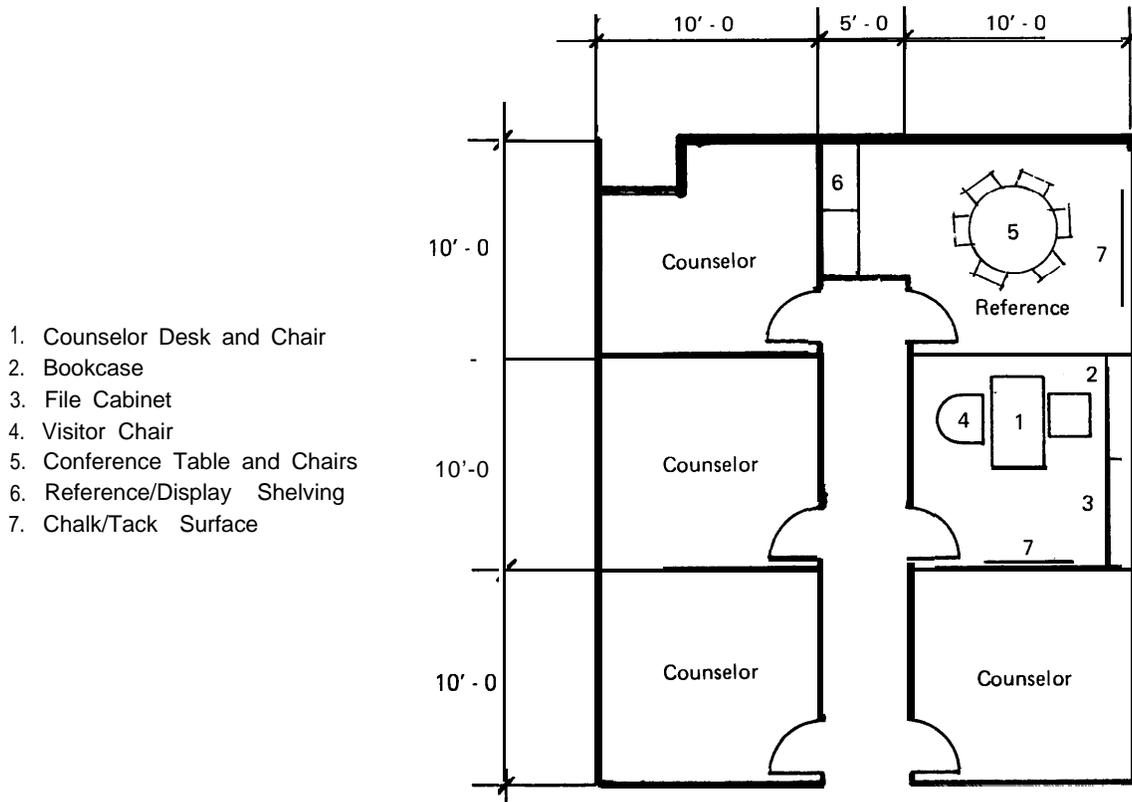


Figure 4-4 Counselor Offices

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4-3 ACADEMIC SPACES

Academic spaces include classrooms, lecture rooms, seminar rooms, MOS library, self-paced instruction room, laboratories, testing room and rehearsal/recording studio.

a. CLASSROOM

Use	For general purpose classes.
Occupant load	24 students, 1 instructor
Space allocation	750 NASF
Adjacency Relationships	Locate together with other academic spaces.
Layout	See Figure 4-5.

1. TV Monitor
2. Instructor's Table and Chair
3. Student Table and Chair
4. Tack Board
5. Chalkboard

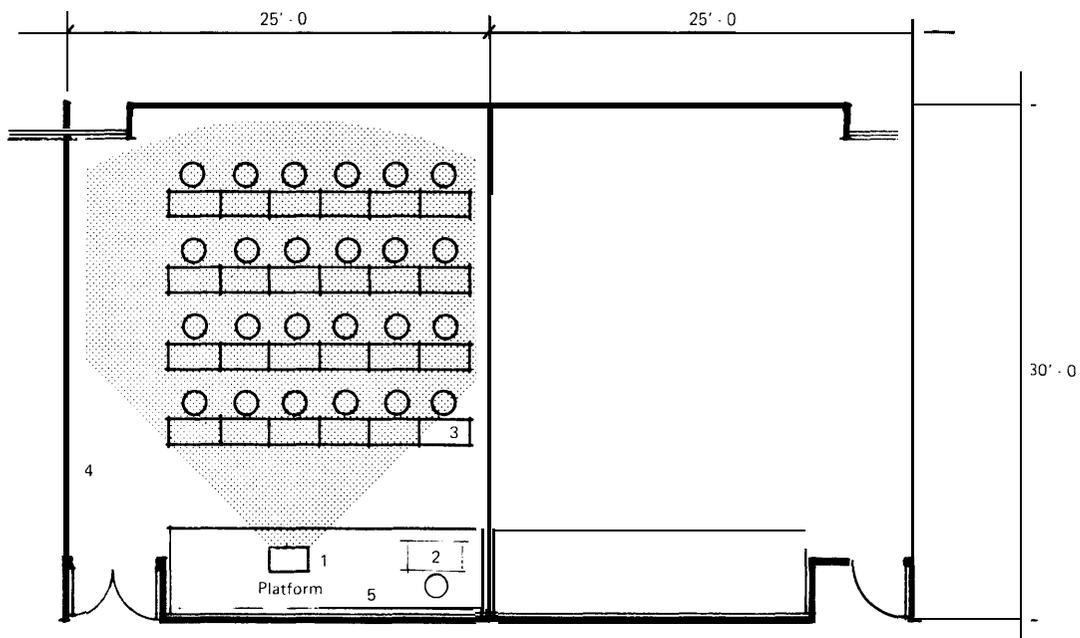


Figure 4-5 Classroom

4-3 ACADEMIC SPACES (cont'd)

b. LECTURE ROOM

Use	For lectures, testing and assemblies, educational and recreational motion pictures, and public meetings.
Occupant load	52 students, 1 instructor
Space allocation	1500 NASF
Adjacency relationships	Locate near classrooms and preferably near main entrance. Should be easily found by persons unfamiliar with the ACES Center. An adjacent lounge would be helpful in handling crowds entering and/or leaving, especially when used for recreation or public meetings.
Layout	See Figure 4-6

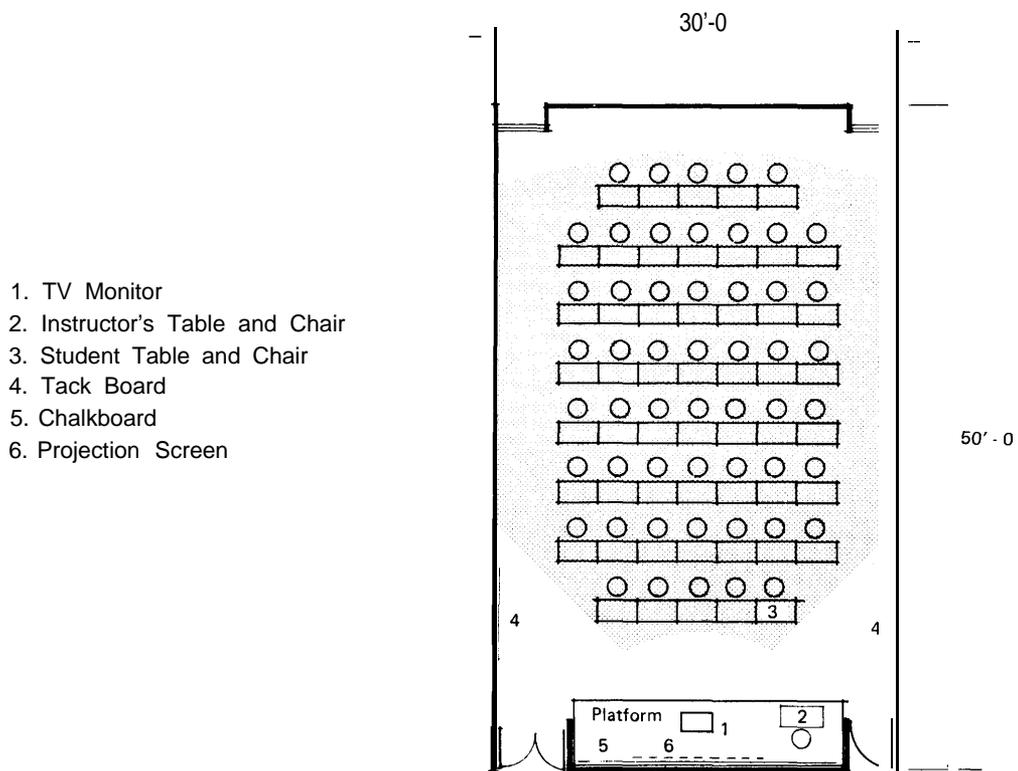


Figure 4-6 Lecture Room

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4-3 ACADEMIC SPACES (cont'd)

c. SEMINAR ROOM

Use	For seminars, small classes and conferences.
Occupant load	12 students, 1 instructor
Space allocation	375 NASF
Adjacency relationships	Locate in proximity of other academic spaces. Maybe grouped or dispersed
Layout	See Figure 4-7

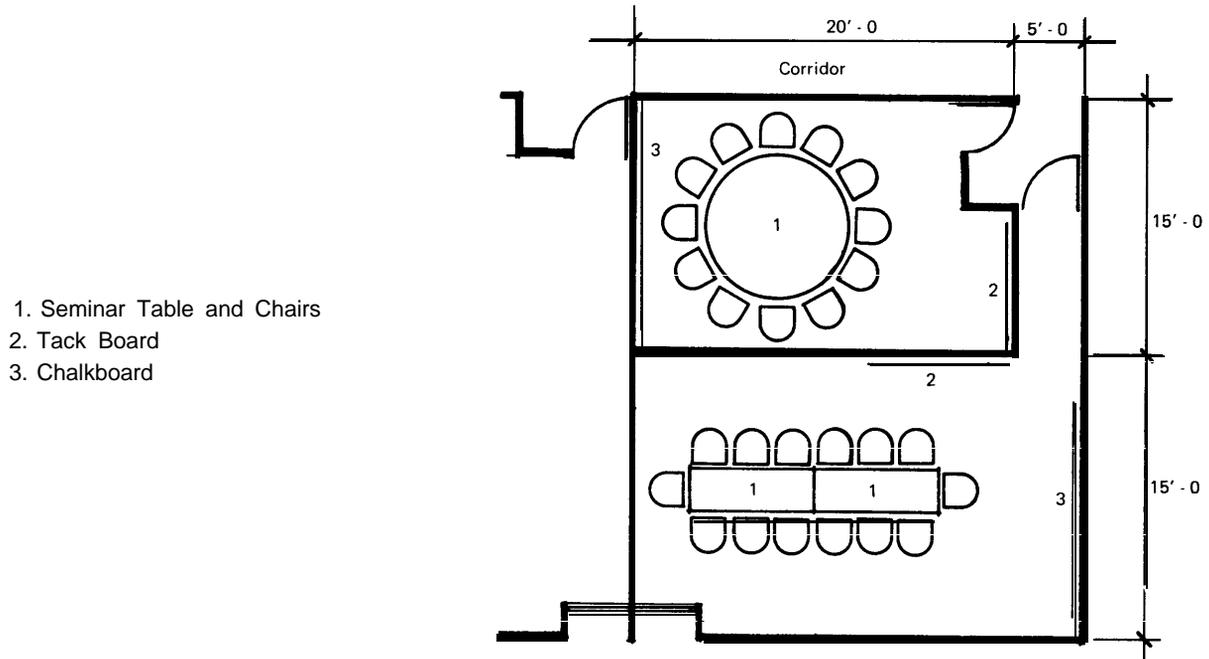


Figure 4-7 Seminar Rooms

4-3 ACADEMIC SPACES (cont'd)

d. MOS LIBRARY

Use	For storage and use of MOS-related material (approximately 10,000 volumes). The library is operated by staff on a schedule basis. In some cases, an MOS librarian may be authorized who would then also occupy the space.
Occupant load	8 students, 1 staff
Space allocation	750 NASF
Adjacency relationships	Adjacent with direct access to Self-Paced Instruction room. Central location to academic spaces is desirable.
Layout	See Figure 4-8

1. Staff Desk and Chair
2. Reading Table and Chairs
3. Reading Carrel and Chair
4. Bookstack
5. Tack Board

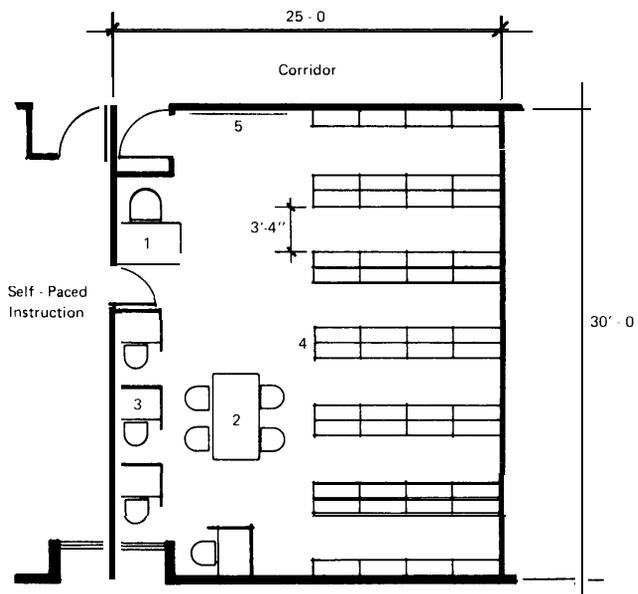


Figure 4-8 MOS Library

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4-3 ACADEMIC SPACES (cont'd)

e. SELF-PACED INSTRUCTION

Use	For individual study of MOS-related and other educational material using AV aids such as audio cassettes with synchronized film strips, slides or videotapes.
Occupant load	19 students, 1 staff
Space allocation	750 NASF
Adjacency relationships	Locate adjacent to the MOS Library
Layout	See Figure 4-9

1. Staff Desk and Chair
2. AV Carrel and Chair
3. Reading Carrel and Chair
4. Acoustic Separation
5. Tack Board
6. Chalkboard

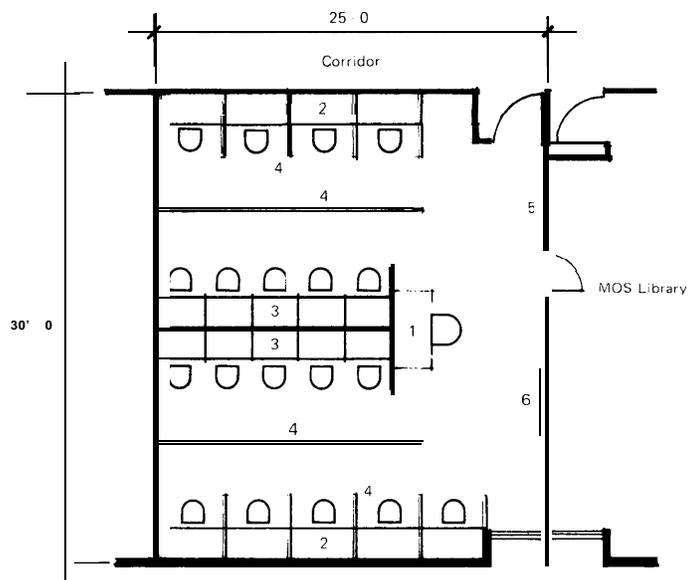


Figure 4-9 Self-Paced Instruction

4-3 ACADEMIC SPACES (cont'd)

f. LANGUAGE LABORATORY

Use	For language instruction where students listen to foreign language recordings, make their own recordings, practice speaking and carry out exercises. Separate spaces are required for storage and taping.								
Occupational load	21 students, 1 instructor								
Space allocation	<table border="0"> <tr> <td>Laboratory</td> <td>600 SF</td> </tr> <tr> <td>Storage</td> <td>95 SF</td> </tr> <tr> <td>Taping</td> <td>55 SF</td> </tr> <tr> <td>Total</td> <td><u>750 NASF</u></td> </tr> </table>	Laboratory	600 SF	Storage	95 SF	Taping	55 SF	Total	<u>750 NASF</u>
Laboratory	600 SF								
Storage	95 SF								
Taping	55 SF								
Total	<u>750 NASF</u>								
Adjacency relationships	Locate in proximity of other academic spaces. Rooms for taping and storage should open directly into laboratory.								
Layout	See Figure 4-10								

1. Instructor's Desk (with TV Monitor) and Chair
2. AV Carrel (with Division Panel) and Chair
3. Tack Board
4. Chalkboard
5. Projection Screen
6. Tape Storage
7. Shelving
8. Table and Chair

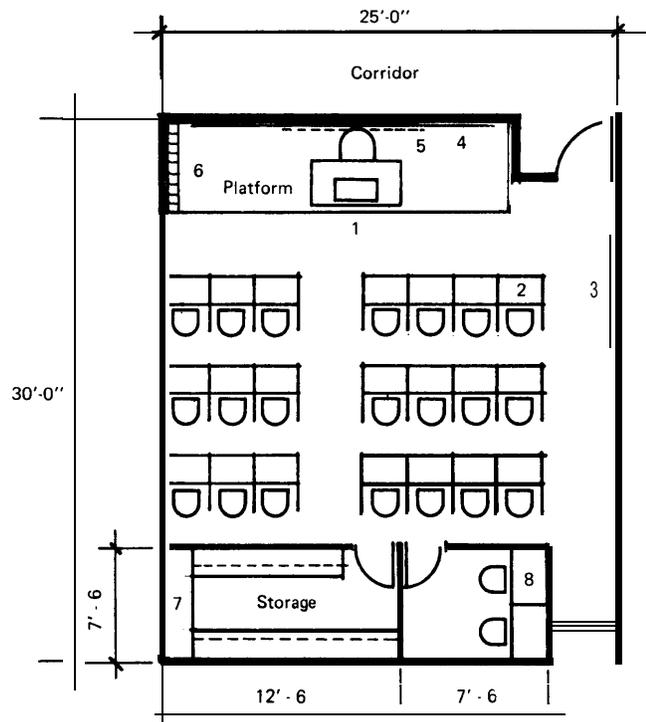


Figure 4-10 Language Laboratory

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4-3 ACADEMIC SPACES (cont'd)

g. SCIENCE LABORATORY

Use	For instruction and experimentation in physics, biology and chemistry. Separate spaces are required for special projects, preparation of materials, and storage.										
Occupant load	24 students, 1 instructor										
Space allocation	<table border="0" style="width: 100%;"> <tr> <td>Laboratory</td> <td style="text-align: right;">1,050 SF</td> </tr> <tr> <td>Special Projects</td> <td style="text-align: right;">225 SF</td> </tr> <tr> <td>Preparation</td> <td style="text-align: right;">125 SF</td> </tr> <tr> <td>Storage</td> <td style="text-align: right;">100 SF</td> </tr> <tr> <td style="border-top: 1px solid black;">Total</td> <td style="text-align: right; border-top: 1px solid black;">1,500 NASF</td> </tr> </table>	Laboratory	1,050 SF	Special Projects	225 SF	Preparation	125 SF	Storage	100 SF	Total	1,500 NASF
Laboratory	1,050 SF										
Special Projects	225 SF										
Preparation	125 SF										
Storage	100 SF										
Total	1,500 NASF										
Adjacency relationships	Locate in proximity of other academic spaces. Rooms for special projects, preparation, and storage should open directly into the laboratory.										
Layout	See Figure 4-11										

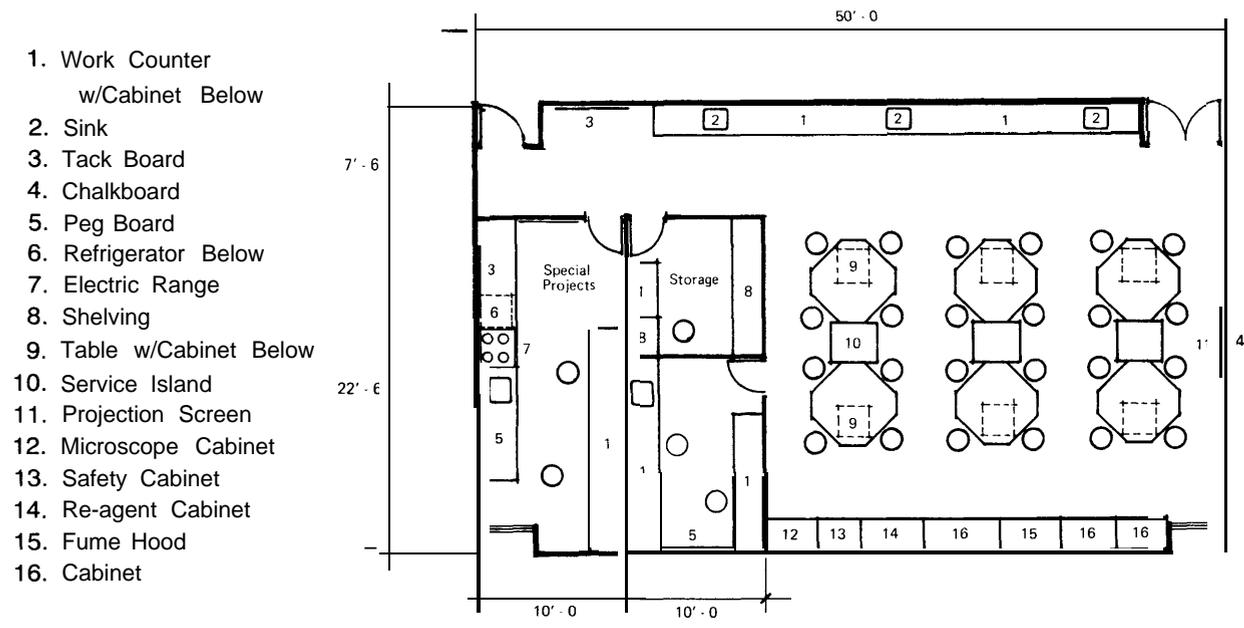


Figure 4-11 Science Laboratory

4-3 ACADEMIC SPACES (cont'd)

h. TESTING ROOM

Use	For testing and general purpose classes. Should be divisible into two classroom spaces. Separate spaces are required for observation and grading of examinations, and storage of extra tables and chairs required for classroom use.										
Occupant load	35 students, 2 instructors for testing 48 students, 2 instructors for classes										
Space allocation	<table border="0"> <tr> <td>Testing Room</td> <td style="text-align: right;">1,625 SF</td> </tr> <tr> <td>Observation/Evaluation</td> <td style="text-align: right;">150 SF</td> </tr> <tr> <td>Secure storage</td> <td style="text-align: right;">55 SF</td> </tr> <tr> <td>Furniture storage</td> <td style="text-align: right;">75 SF</td> </tr> <tr> <td style="text-align: center;">Total</td> <td style="text-align: right; border-top: 1px solid black;">1,905 NASF</td> </tr> </table>	Testing Room	1,625 SF	Observation/Evaluation	150 SF	Secure storage	55 SF	Furniture storage	75 SF	Total	1,905 NASF
Testing Room	1,625 SF										
Observation/Evaluation	150 SF										
Secure storage	55 SF										
Furniture storage	75 SF										
Total	1,905 NASF										
Adjacency relationships	Locate near to classrooms and lecture room. Spaces for observation and storage should open directly into the testing room.										
Layout	See Figure 4-12										

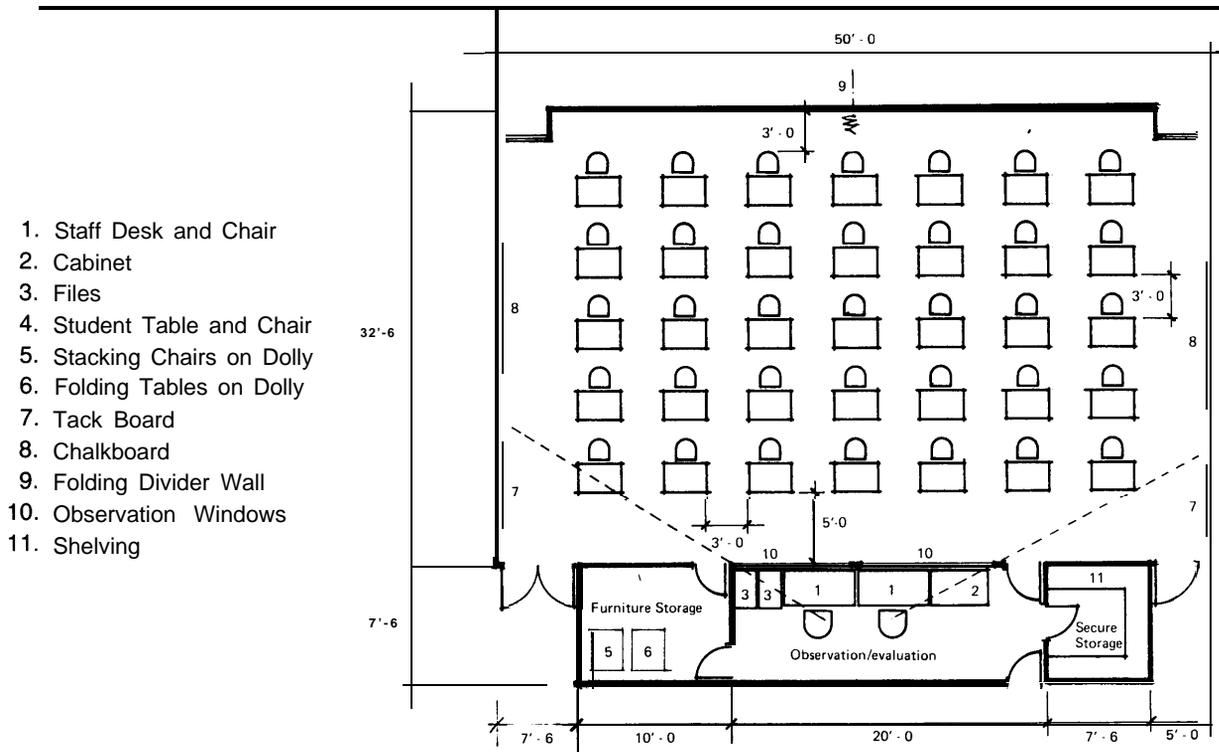


Figure 4-12 Testing Room

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4-3 ACADEMIC SPACES (cont'd)

i. REHEARSAL/RECORDING STUDIO

Use	For rehearsals of lectures and demonstrations as well as for taping lectures for video presentation. May also be used for seminars.
Occupant load	6 persons
Space allocation	375 NASF
Adjacency relationships	Locate centrally to the academic area and near to lecture and seminar areas.
Layout	See Figure 4-13

- 1. Instructor's Table (or lecturn) with AV Controls
- 2. TV Monitor and Recorder
- 3. Tack Board
- 4. Chalkboard
- 5. Projection Screen
- 6. Projector/TV Camera
- 7. Table and Chair
- 8. Sound Lock Door

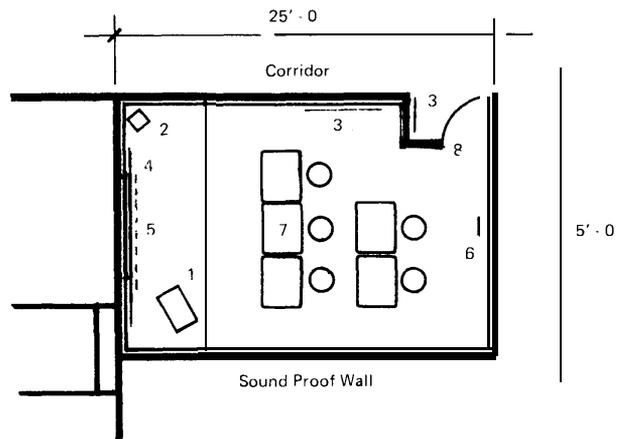


Figure 4-13 Rehearsal/Recording Studio

4-4 VOCATIONAL TRAINING SPACES

Vocational training spaces include shops for the following types of training:

Heating/Refrigeration/Air Conditioning

Construction Electrician

Communications/Industrial Electronics

Masonry

Carpentry

Plumbing

Diesel Mechanics

Auto Mechanics

Welding

Auto Body Repair

Small Engine Repair

Other courses may be offered, and each building project should reflect the specific requirements of the local program. Also, layouts must be verified by the using installation to assure that they conform to current programs and technologies. Laboratory ceiling heights should generally provide 16' minimum clearance, and each laboratory should have access to an outside service area. Vocational training shops require ample storage. The areas allocated to storage in this guide may be revised if necessary.

4-4 VOCATIONAL TRAINING SPACES (cont'd)

a. HEATING/REFRIGERATION/AIR CONDITIONING SHOP

Use	For lectures, demonstrations and laboratory experimentation with heating, air-conditioning and refrigeration units.
Occupant load	20 persons
Space allocation	2200 NASF
Adjacency relationships	Locate near to Plumbing Shop and Construction Electrician Shop with personnel access to exterior.
Layout	See Figure 4-14

b. CONSTRUCTION ELECTRICIAN SHOP

Use	For lectures, demonstrations and laboratory experimentation with electrical wiring systems related to building construction. Separate spaces are required for secure storage of tools and supply parts and for conferences.	
Occupant load	20 persons	
Space allocation	Shop	2,000 SF
	Tool Storage	150 SF
	Supply Parts	150 SF
	Conference	150 SF
	Total	2,450 NASF
Adjacency relationships	Locate near to Communications/Industrial Electronics Shop and the Heating/Refrigeration/Air Conditioning Shop with personnel and service access to exterior service area. Locate tool storage, supply parts, and conference rooms near entrance and open directly into shop.	
Layout	See Figure 4-15	

4-4 VOCATIONAL TRAINING SPACES (cont'd)

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Test Stand 2. Combined Forced Air & Hydronic Heating Training Units 3. Heating Test Equipment Package 4. Gas Fired Forced Air Control Board 5. Oil Fired Forced Air Control Board 6. Automobile Air Conditioner Training Unit 7. Cooling Tower Build-up Unit 8. Automobile Air Conditioner Training Unit 9. Oil Burner Climate Control Trainer 10. Gas Burner Climate Control Trainer 11. Refrigeration and Air Conditioning Test Equipment Package 12. Medium Commercial Multiple Evaporator Build-up Unit 13. Medium Commercial-Forced Convection Evaporator-Open Type Compressor Build-up Unit 14. Medium Commercial-Forced Convection Evaporator-Semi-Hermetic 15. Commercial Freezer-Electric Defrost Build-up Unit 16. Light Commercial Freezer-Air Conditioner Build-up Unit | <ol style="list-style-type: none"> 17. Medium Commercial Forced Convection Evaporator Build-up Unit 18. Light Commercial Forced Convection Evaporator Build-up Unit 19. Light Commercial-Gravity Evaporator Build-up Unit 20. Domestic Refrigeration Trainer Double Evaporation Build-up Unit 21. Air Conditioner Build-up Unit 22. Domestic Refrigeration Trainer Single Evaporator Build-up Unit 23. Industrial Refrigeration Trainer 24. Refrigeration and Air Conditioning Training Units 25. Single Phase Compressor Control Board 26. Refrigeration and Air Conditioning Training Units—Heat Pump Operation 27. Work Bench 28. Work Station 29. Table 30. Chalk/Tack Surfaces 31. Cabinet w/sink |
|---|---|

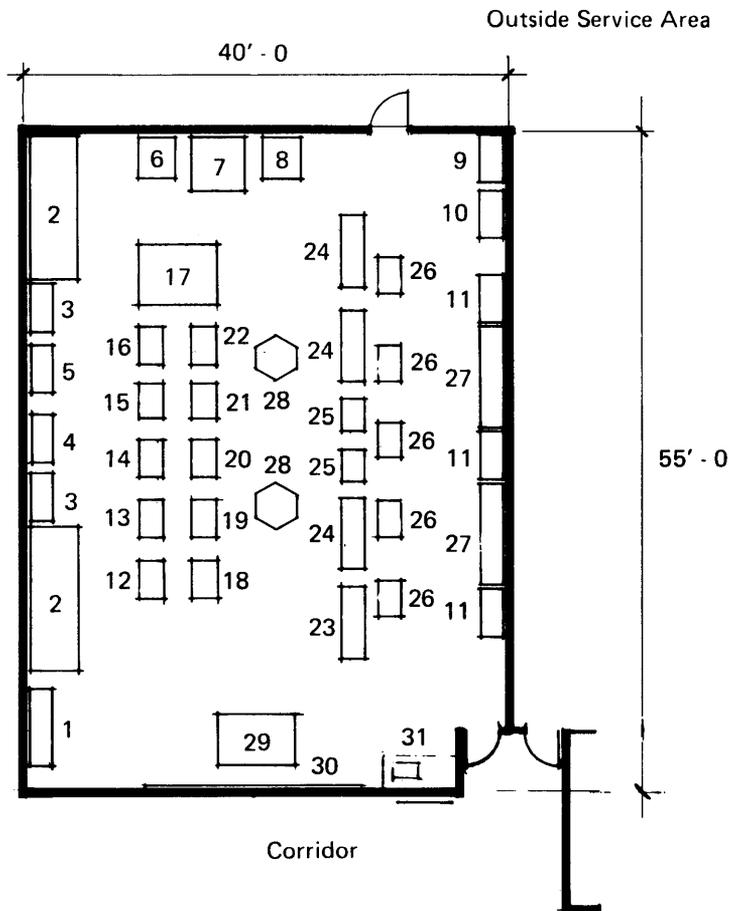


Figure 4-14 Heating/Refrigeration/Air Conditioning Shop

4-4 VOCATIONAL TRAINING SPACES (cont'd)

c. COMMUNICATION/INDUSTRIAL ELECTRONICS SHOP

Use	For lectures, demonstrations and laboratory experimentation with basic communications, electrical and electronic systems, and motor machines. Separate spaces are required for secure storage of tools, general storage and for conferences.	
Occupant load	20 persons	
Space allocation	Shop	2,000 SF
	Tool Storage	150 SF
	General Storage	225 SF
	Conference	150 SF
	Total	2,525 SF
Adjacency relationships	Locate near Construction Electrician Shop with personnel and service access to exterior service area. Locate storage and conference rooms near entrance and open directly into shop.	
Layout	See Figure 4-16	

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4-4 VOCATIONAL TRAINING SPACES (cont'd)

- | | |
|-------------------------------------|---|
| 1. Electrical Benches | 15. Motor Control Units |
| 2. Basic Electricity Trainers | 16. Mobile Console |
| 3. Electricity-Electronics Trainers | 17. Tool Storage |
| 4. Power Tunnels | 18. Synchronizing Switch/Circuit Breakers |
| 5. 5" V.I.Z. Oscilloscope | 19. Three Phase Synchronous Motor Starter |
| 6. Electrical Wiring Tunnel | 20. AC Three Phase Starter |
| 7. Security Alarm Trainer | 21. AC Motor Starter |
| 8. AC Wiring and Lighting Simulator | 22. Overhead Door |
| 9. Residential Wiring Trainer | 23. Conference Table and Chairs |
| 10. Basic Studies of Transformers | 24. Chalkboard |
| 11. Single Phase DC Machines | 25. Tack Board |
| 12. Three Phase Machines | 26. Tool Storage Cabinet |
| 13. Specialized Machines | 27. Industrial Shelving |
| 14. Optional Accessories for Motors | |

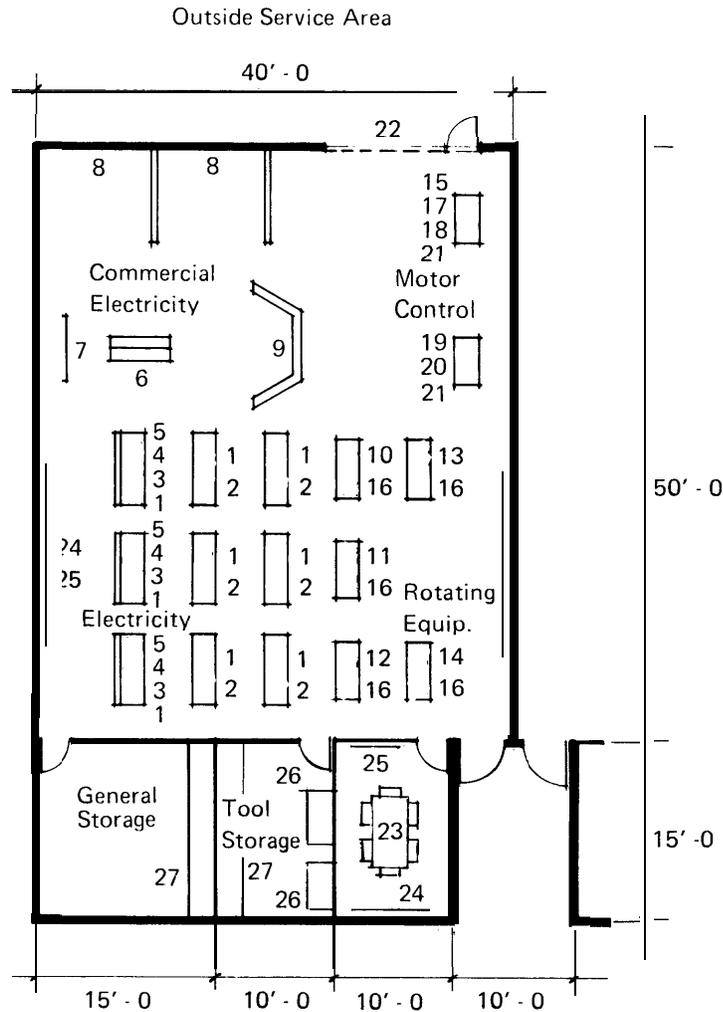


Figure 4-16 Communications/Industrial Electronic Shop

4-4 VOCATIONAL TRAINING SPACES (cont'd)

d. MASONRY SHOP

Use	For lectures, demonstrations and laboratory experience in masonry construction. Separate spaces are required for secure storage of tools, general storage, and for conferences.	
Occupant load	20 persons	
Space allocation	Shop	3,250 SF
	Tool Storage	375 SF
	General Storage	375 SF
	Conference	<u>150 SF</u>
	Total	4,150 NASF
Adjacency relationships	Locate in area of Carpentry, Plumbing and Heating/Refrigeration/Air-Conditioning Shops with personnel and service access to exterior. Locate storage and conference rooms near entrance and open directly into shop.	
Layout	See Figure 4-17	

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4-4 VOCATIONAL TRAINING SPACES (cont'd)

- | | |
|--------------------------|--------------------------------|
| 1. Mortar Box | 8. Divider Screens |
| 2. Wheelbarrows | 9. Conference Table and Chairs |
| 3. Brick and Tile Barrow | 10. Chalkboard |
| 4. Utility Hand Truck | 11. Tack Board |
| 5. Concrete Mixers | 12. Tool Storage Cabinet |
| 6. Mortar Mixers | 13. Industrial Shelving |
| 7. Overhead Door | |

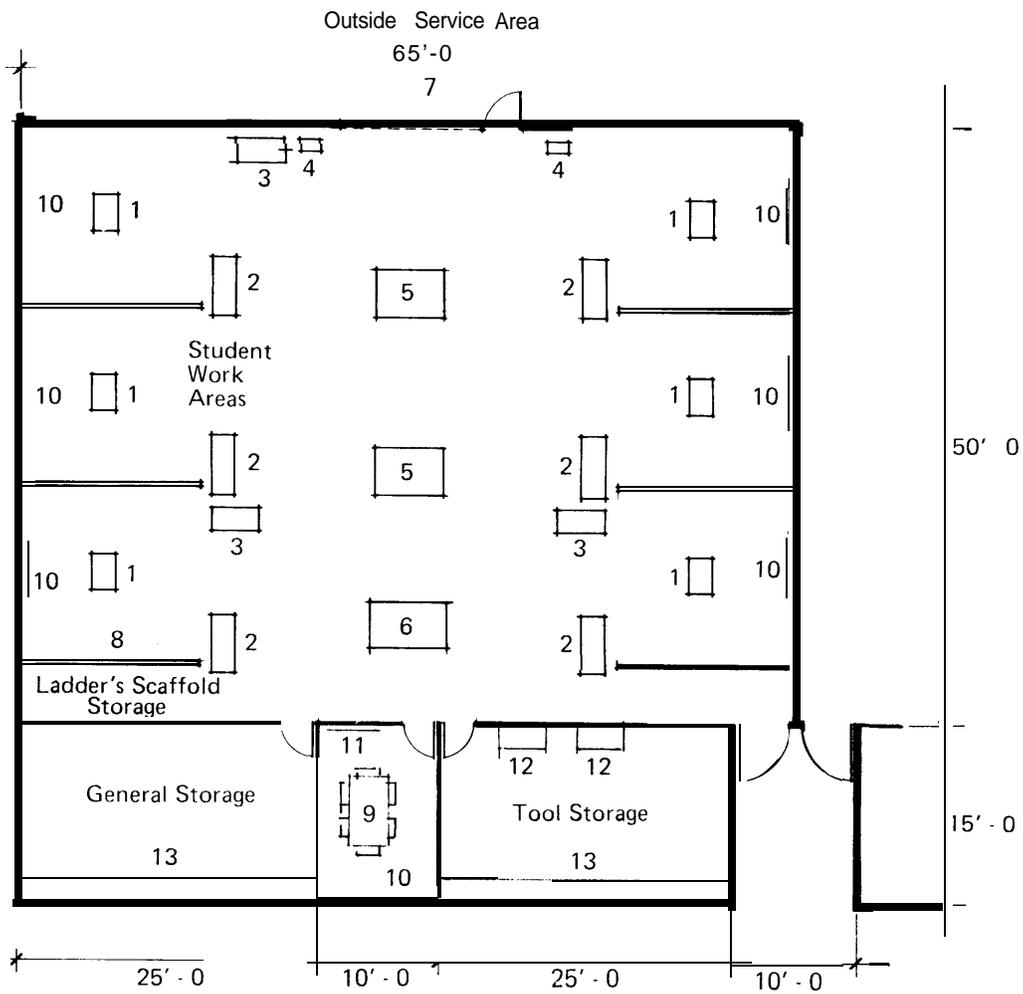


Figure 4-17 Masonry Shop

4-4 VOCATIONAL TRAINING SPACES (cont'd)

e. CARPENTRY SHOP

Use	For lectures, demonstrations and laboratory experience in rough and finish carpentry. Separate spaces are required for tool/supply storage, finish work, and conferences.	
Occupant load	20 persons	
Space allocation	Shop	4,000 SF
	Tool/Supply Storage	300 SF
	Finish room	225 SF
	Conference	150 SF
	Total	4,675 NASF
Adjacency relationships	Locate near Plumbing, Masonry and Heating/Refrigeration/Air-Conditioning Shops with personnel and service access to outside service area. Locate tool/supply, finish and conference rooms near entrance and open directly into shop.	
Layout	See Figure 4-18	

INDIVIDUAL SPACE CRITERIA

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4-4 VOCATIONAL TRAINING SPACES (cont'd)

- | | |
|----------------------------|---------------------------------|
| 1. Work Bench | 10. Overhead Door |
| 2. Tilting Arbor Saw | 11. Divider Screens |
| 3. Long-bed Jointer | 12. Conference Table and Chairs |
| 4. Four Station Work Bench | 13. Chalkboard |
| 5. Drill Press | 14. Tack Board |
| 6. Panel Saw | 15. Cabinet with Sink |
| 7. Sliding Door Cabinets | 16. Table |
| 8. Radial Saw | 17. Tool Storage Cabinet |
| 9. Lumber Rack | 18. Industrial Shelving |

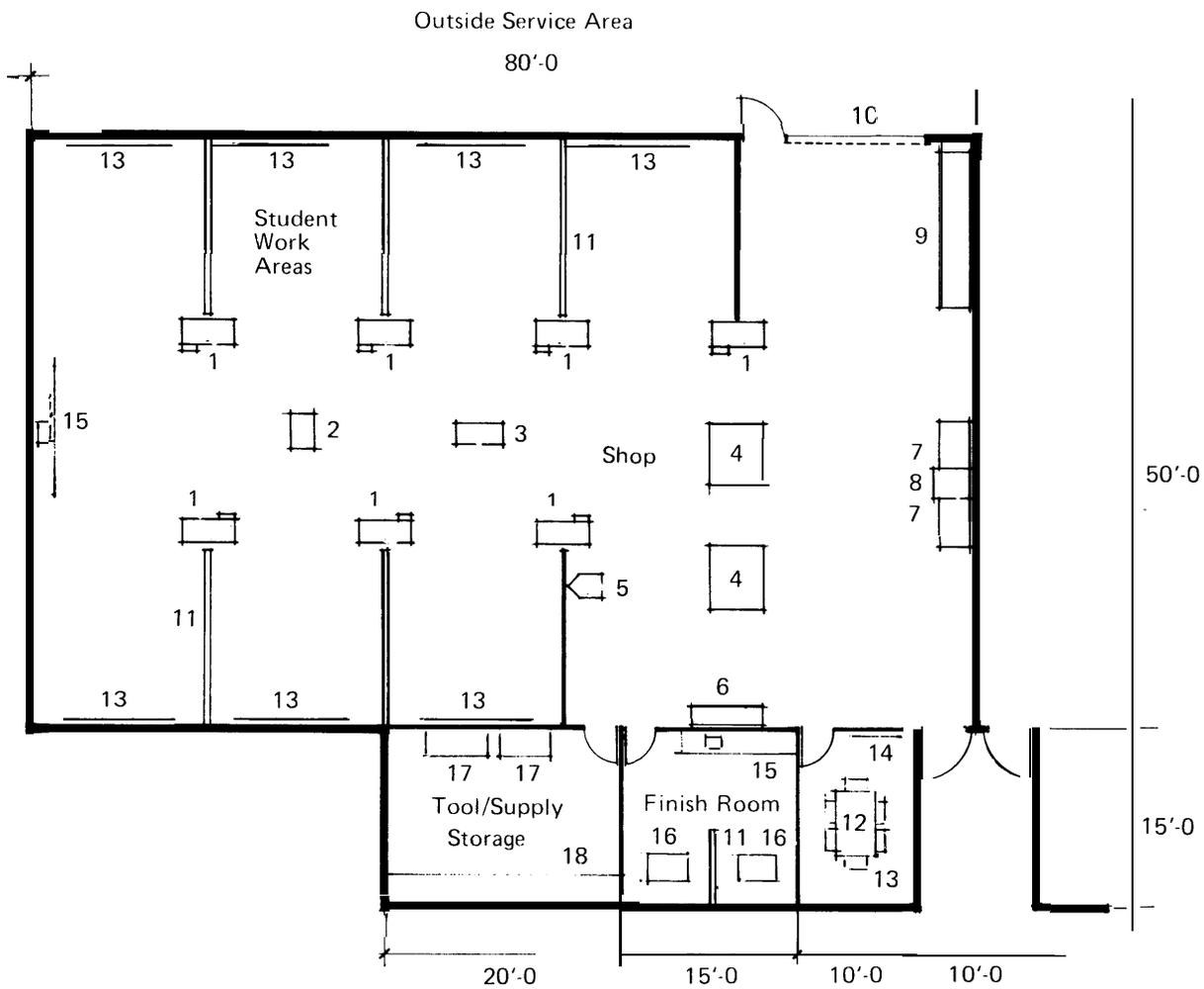


Figure 4-18 Carpentery Shop

4-4 VOCATIONAL TRAINING SPACES (cont'd)

f. PLUMBING SHOP

Use	For lectures, demonstrations and laboratory experience in plumbing. Separate spaces are required for secure storage of tools, general storage and for conferences.	
Occupant load	20 persons	
Space allocation	Shop	2,000 SF
	General Storage	150 SF
	Tool Storage	150 SF
	Conference	<u>150 SF</u>
	Total	2,450 NASF
Adjacency relationships	Locate near Carpentry and Heating/Refrigeration/Air-conditioning Shops with service access to outside service area. Locate general storage, tool and conference rooms near entrance and open directly into shop.	
Layout	See Figure 4-19	

INDIVIDUAL SPACE CRITERIA

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4-4 VOCATIONAL TRAINING SPACES (cont'd)

- | | |
|------------------------------------|---------------------------------|
| 1. Portable Tri-stand Vise | 9. Metal and Scrap Rack |
| 2. Metal Porta-bench | 10. Overhead Door |
| 3. Pipe and Bolt Threading Machine | 11. Divider Screens |
| 4. Adjustable Pipe Support | 12. Conference Table and Chairs |
| 5. Parts Storage | 13. Chalkboard |
| 6. Wall Assembly Unit | 14. Tack Board |
| 7. Box and Pan Brakes | 15. Cabinet w/sink |
| 8. Hand Operated Rollers | 16. Tool Storage Cabinet |
| | 17. Industrial Shelving |

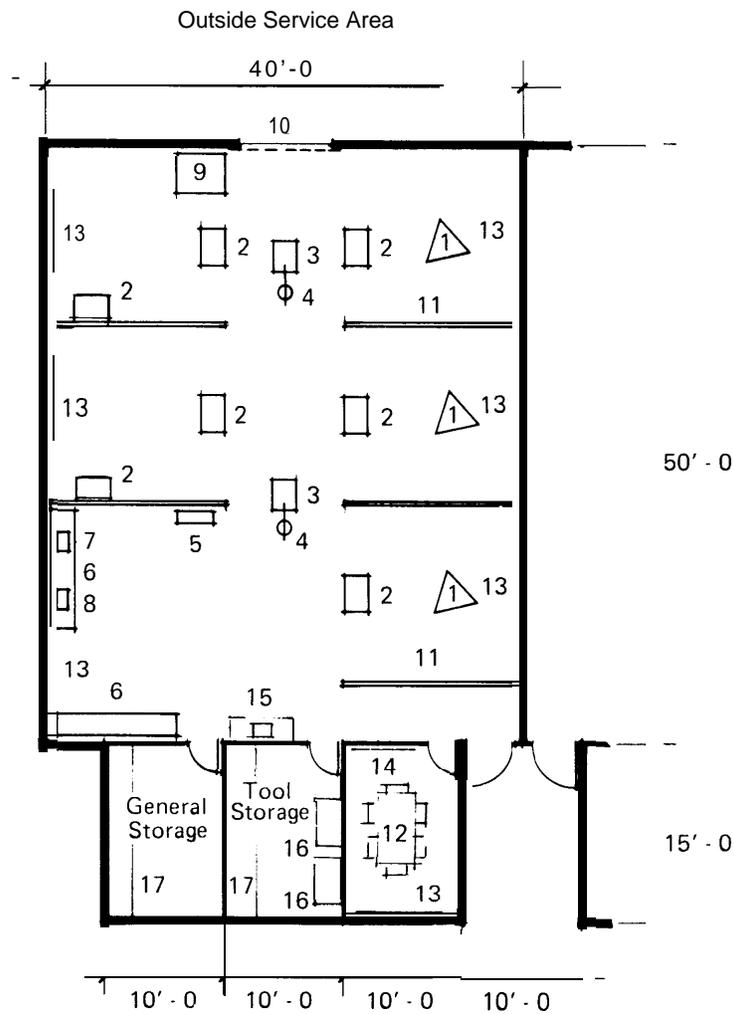


Figure 4-19 Plumbing Shop

4-4 VOCATIONAL TRAINING SPACES (cont'd)

g. DIESEL MECHANICS SHOP

Use	For lectures, demonstrations and laboratory experience in diesel mechanics. Separate spaces are required for storage of tools and for conferences.	
Occupant load	20 persons	
Space allocation	Shop	2,800 SF
	Tool Storage	225 SF
	Conference	150 SF
	Total	3,175 NASF
Adjacency relationships	Locate near Auto Mechanics and Plumbing Shops with service and personnel access to outside service area. Locate tool storage and conference rooms near entrance and open directly into shop.	
Layout	See Figure 4-20	

INDIVIDUAL SPACE CRITERIA

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4-4 VOCATIONAL TRAINING SPACES (cont'd)

- | | |
|-------------------------------------|--|
| 1. Engine Service Module | 19. Storage Cabinet |
| 2. Instruction Module | 20. Wall Bench |
| 3. Battery Service Module | 21. Injector Floor Comparator |
| 4. Parts Module | 22. Bacharach Pump-Injector Test Package |
| 5. Wet Cleaning Module | 23. Hydraulic Training Unit |
| 6. Liquid Fuel Module | 24. Advanced Hydraulic Kit |
| 7. Dynamometer Module | 25. Goggle Cabinet |
| 8. Dry Cleaning Module | 26. File Cabinet/Reference Module |
| 9. Special Tool Module | 27. Tool Storage Cabinet |
| 10. Engine Work Stand | 28. Hardware Cabinet |
| 11. 2-station Work Bench | 29. Industrial Shelving |
| 12. Engine Work Stand w/accessories | 30. Machinists' Vise |
| 13. 7" Pedestal Grinder | 31. Overhead Door |
| 14. 15" Drill Press | 32. Cabinet w/sink |
| 15. 25 Ton Arbor Press | 33. Conference Table and Chairs |
| 16. Parts Washer | 34. Chaikboard |
| 17. Steam Cleaner | 35. Tack Board |
| 18. 4-station Work Bench | |

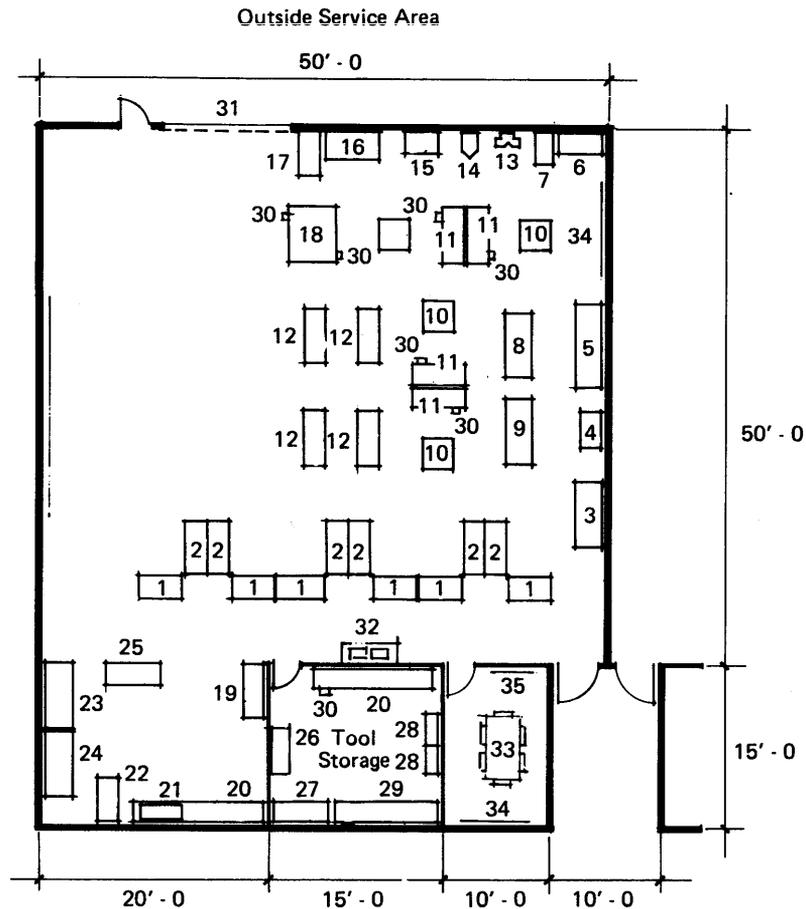


Figure 4-20 Diesel Mechanics Shop

4-4 VOCATIONAL TRAINING SPACES (cont'd)

h. AUTO MECHANICS SHOP

Use	For lectures, demonstrations and laboratory experience in auto mechanics. Separate spaces are required for general and tool storage and for conferences. Outside storage for approximately ten cars, fenced for security and screening, is also required.	
Occupant load	20 persons	
Space allocation	Shop	5,250 SF
	Tool Storage	225 SF
	General Storage	225 SF
	Conference	150 SF
	Total	<u>5,850 NASF</u>
	Outside Auto Storage 2000 SF (approximately)	
Adjacency relationships	Locate near Diesel Mechanics, Welding, and Plumbing Shops with personnel and multi-service accesses to outside service area and auto storage. Locate storage rooms and conference room near entrance and open directly into shop.	
Layout	See Figure 4-21	

INDIVIDUAL SPACE CRITERIA

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4-4 VOCATIONAL TRAINING SPACES (cont'd)

- | | |
|-------------------------------|---|
| 1. Wheel Visual Balancer | 20. Steam Cleaner |
| 2. Battery Charger | 21. Engine Stand |
| 3. Tire Changer | 22. 15" Drill Press with Motor |
| 4. Work Bench | 23. Parts Washer |
| 5. 2 Ton Ball Bearing Trolley | 24. Generator-Alternator-Regulator Test Bench |
| 6. Press — 40 ton | 25. Bolt-Amp Tester |
| 7. Work Bench | 26. Battery-Starter Testers |
| 8. Mechanical Service Bay | 27. Ignition Simulator |
| 9. Spark Plug Cleaner | 28. Goggle Cabinet |
| 10. Air Conditioner Tester | 29. Tool Cabinet |
| 11. Armature Tester | 30. Tool Storage Cabinet |
| 12. Engine Analyzer | 31. Industrial Shelving |
| 13. Infra-Red Co/HC Analyzer | 32. Storage Cabinets |
| 14. Distributor Tester | 33. Cabinet w/sink |
| 15. Shop Desk | 34. Overhead Door |
| 16. Auto Lift | 35. Conference Table and Chairs |
| 17. Valve Grinding Shop | 36. Chalkboard |
| 18. Brake Shop | 37. Tack Board |
| 19. 12" Grinder | |

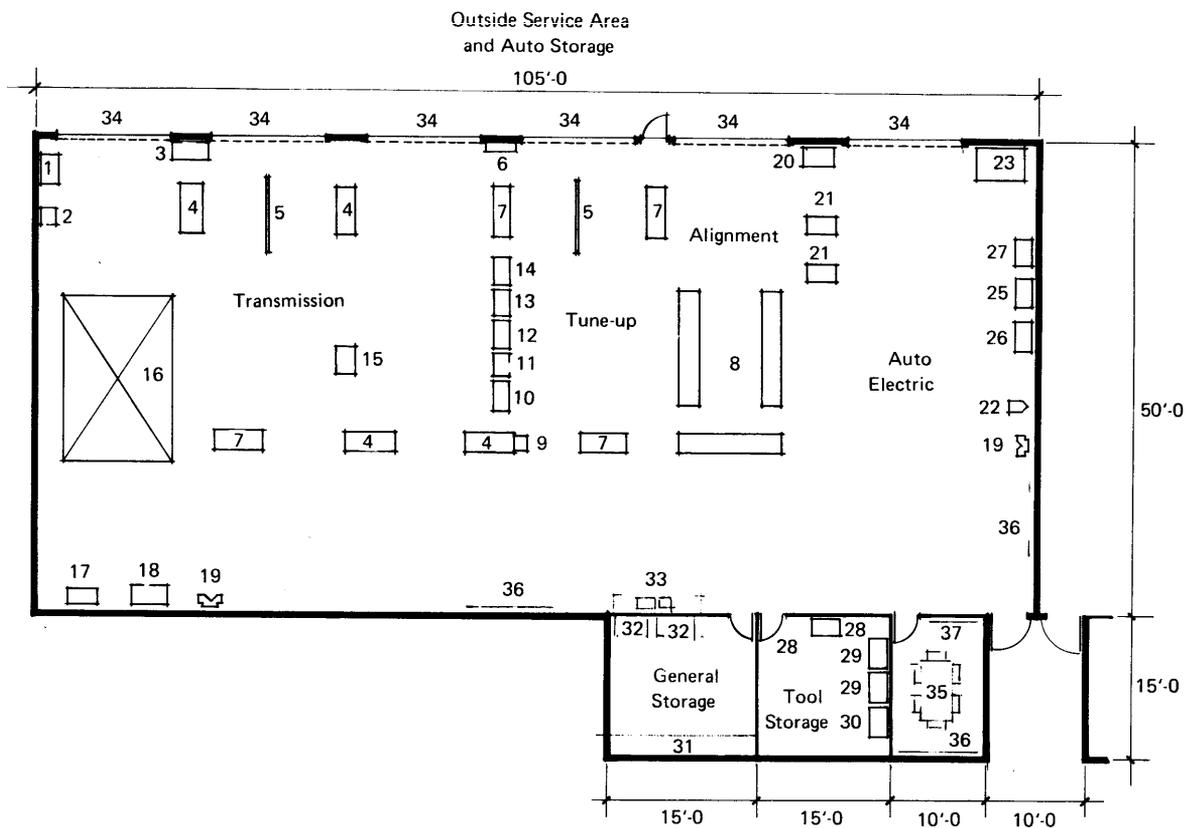


Figure 4-21 Auto Mechanics Shop

4-4 VOCATIONAL TRAINING SPACES (cont'd)

i. WELDING SHOP

Use	For lectures, demonstrations and laboratory experience with gas and arc welding equipment. Separate spaces are required for tool and general storage, for storing gas and oxygen safely, and for conferences. A small facility for outside scrap storage is also required.	
Occupant load	20 persons	
Space allocation	Shop	3,875 SF
	Tool Storage	150 SF
	General Storage	150 SF
	Conference	150 SF
	Gas and Oxygen Storage (2@ 75)	150 SF
	Total	4,475 NASF
Adjacency relationships	Locate near Auto Mechanics and Auto Body Repair Shops with personnel and service access to outside service area. Locate scrap storage adjacent within service area. Locate gas and oxygen storage in explosion-proof rooms having direct access to outside service area as well as to shop. Locate other rooms for storage and conference near main entrance and open directly into shop.	
Layout	See Figure 4-22	

INDIVIDUAL SPACE CRITERIA

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4-4 VOCATIONAL TRAINING SPACES (cont'd)

- | | |
|----------------------------------|--------------------------------------|
| 1. Arc Welder | 14. Four Station Metal Working Bench |
| 2. Arc Welding Bench | 15. Machinists' Vise |
| 3. Two-station Gas Welding Bench | 16. Work Bench |
| 4. Pedestal Grinder | 17. Welding Testing Center |
| 5. Steel Top Layout Table | 18. Heat Treating Furnace |
| 6. TIG Welding Unit on Wheels | 19. Drill Press |
| 7. MIG-RID 3 Welding Unit | 20. Overhead Door |
| 8. Arc Welder with Wheels | 21. Cabinet with sink |
| 9. Anvil with Stand | 22. Tool Storage Cabinet |
| 10. Welding and Cutting Outfit | 23. Industrial Shelving |
| 11. Bar Storage Racks | 24. Conference Table and Chairs |
| 12. Spot Welder | 25. Chalkboard |
| 13. Power Hacksaw | 26. Tack Board |

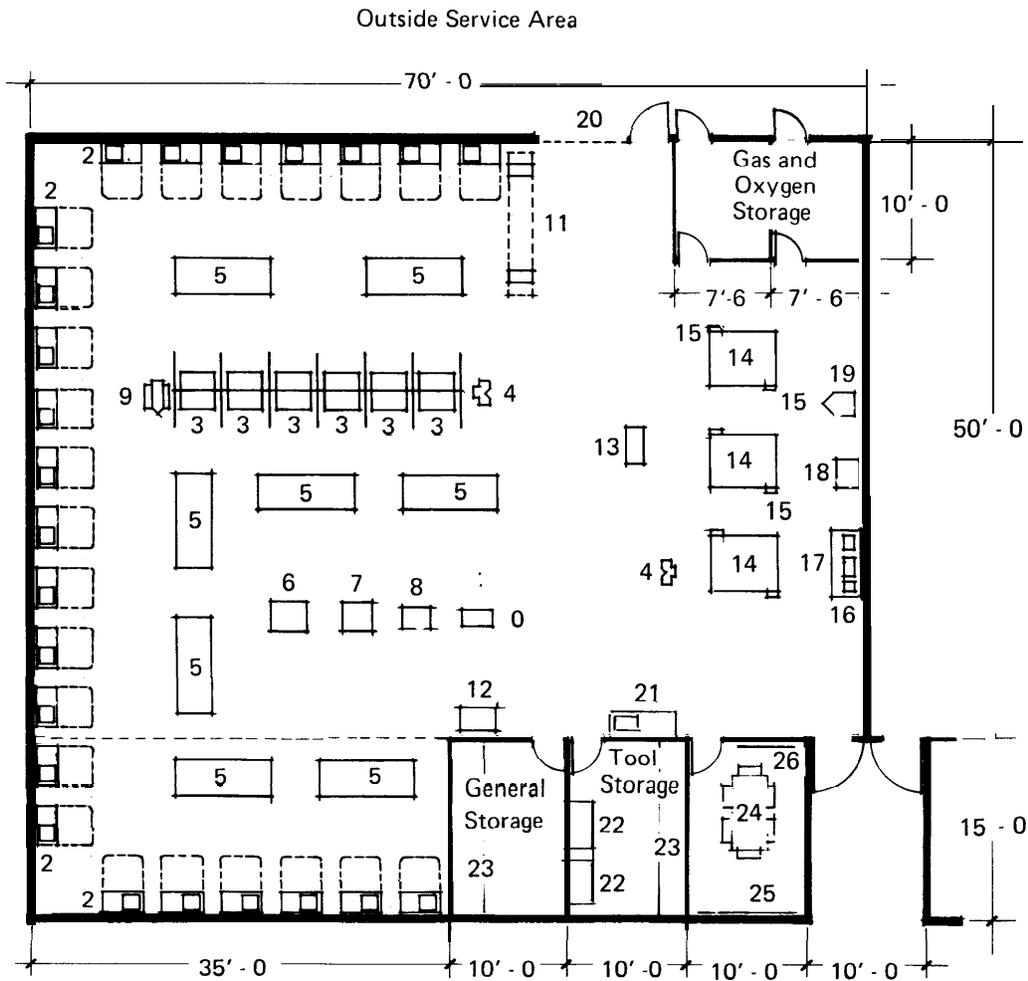


Figure 4-22 Welding Shop

4-4 VOCATIONAL TRAINING SPACES (cont'd)

j. AUTO BODY REPAIR SHOP

Use For lectures, demonstrations and laboratory experience in auto body repair. Separate spaces are required for spray painting, for paint, tool and general storage, and for conferences. Outside storage for approximately ten cars and space for scrap storage is also required.

Occupant load 20 persons

Space allocation	Shop	3,650 SF
	Spray Painting Room	600 SF
	Paint Storage	75 SF
	General Storage	450 SF
	Tool Storage	150 SF
	Conference	150 SF
	Total	5,075 NASF

Outside Auto Storage 2000 SF (approximately)

Adjacency relationships Locate near Welding Shop and Auto Mechanics Shop with personnel and multi-service accesses to outside service area. Outside auto and scrap storage areas should be adjacent. When provided with the Auto Mechanics Shop and/or Welding Shops, such areas should be centralized for combined use. Spray painting and paint storage should be located in separate, fire-proof rooms. The spray painting room should have direct service access to the outside service area. Locate rooms for general storage, tool storage and conference near entrance and open directly into shop.

Layout See Figure 4-23

INDIVIDUAL SPACE CRITERIA

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4-4 VOCATIONAL TRAINING SPACES (cont'd)

- | | |
|---|--|
| 1. 15" Drill Press with Motor | 11. Infra-red Heater |
| 2. Combination Buffer/Grinder | 12. Complete Professional Spray Outfit |
| 3. Hardware Cabinet | 13. Overhead Door |
| 4. Work Bench | 14. Cabinet with Sink |
| 5. Spot Welder | 15. Tool Storage Cabinet |
| 6. Welding Package | 16. Industrial Shelving |
| 7. Steam Cleaner/Washer | 17. Conference Table and Chairs |
| 8. Auto Body and Frame Alignment System | 18. Chalkboard |
| 9. Work Bench | 19. Tack Board. |
| 10. Paint Cabinet | |

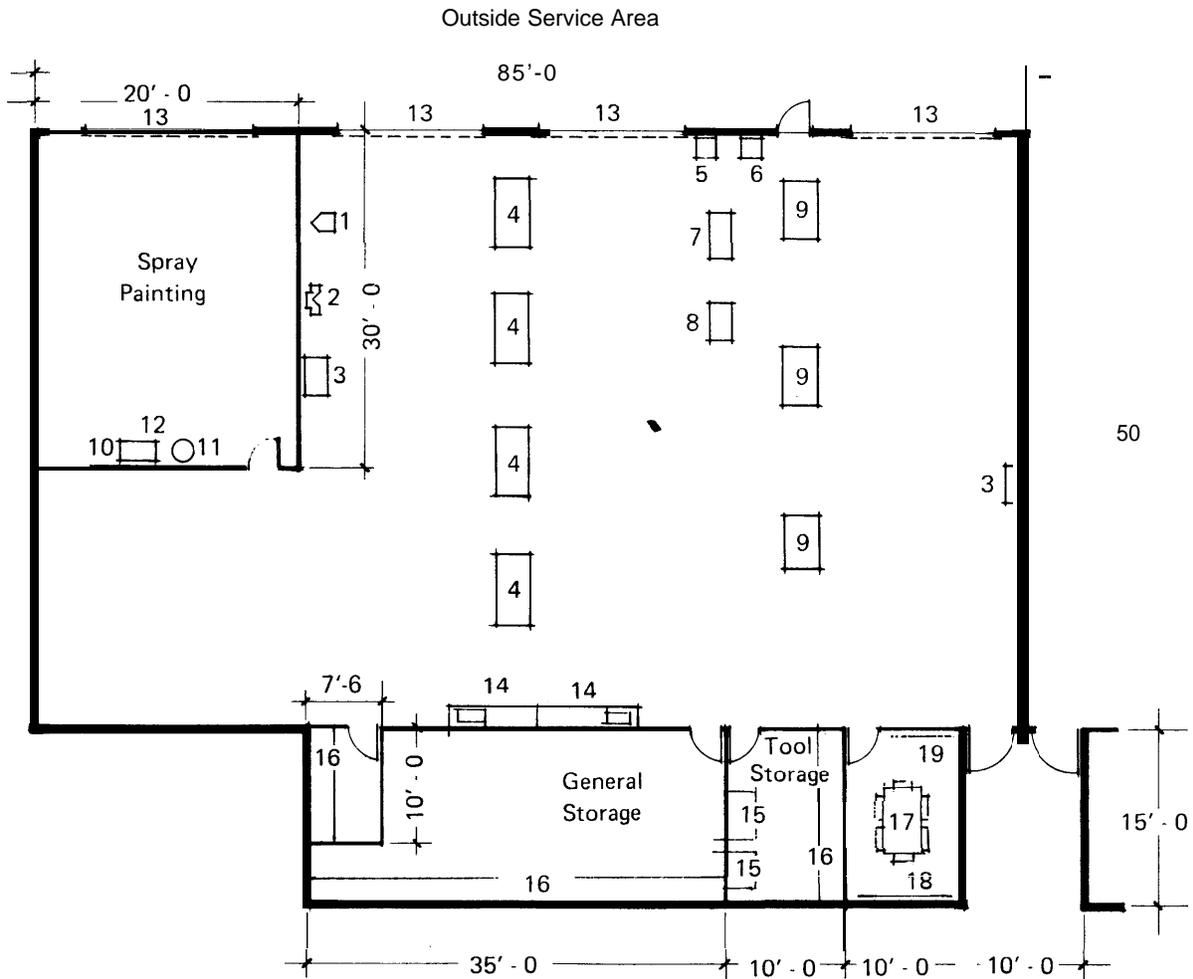


Figure 4-23 Auto Body Repair Shop

4-4 VOCATIONAL TRAINING SPACES (cont'd)

k. SMALL ENGINE REPAIR SHOP

Use	For lectures, demonstrations and laboratory experience in small engine repair. Separate spaces are required for tool and general storage, and for conferences.	
Occupant load	20 persons	
Space allocation	Shop	3,000 SF
	General Storage	375 SF
	Tool Storage	150 SF
	Conference	150 SF
	Total	<u>3,675 NASF</u>
Adjacency relationships	Locate near Heating/Refrigeration/Air-conditioning Shop and Communications/Industrial Electronics Shop with personnel and service access to outside service area. Locate rooms for general storage, tool storage and conference near entrance and open directly into shop.	
Layout	See Figure 4-24	

INDIVIDUAL SPACE CRITERIA

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4-4 VOCATIONAL TRAINING SPACES (cont'd)

- | | |
|---|-------------------------------------|
| 1. Portable Work Bench | 16. Parts Washer |
| 2. Work Bench w/2 Mechanic's Vises | 17. Utility 15" Drill Press |
| 3. Swivel Engine Stand | 18. Long Shaft Buffer-wire Wheel |
| 4. Bench Mounted Holding Fixture | 19. Grinder with Stand |
| 5. Bench Powerlab with tools (exhaust gas collection vent needed) | 20. Outboard Motor Stand – Portable |
| 6. Portable Engine Hoist | 21. Outboard Motor Stand |
| 7. Small Engine Technology Center | 22. Outboard Motor Test Tank |
| 8. Power Mechanic Teaching System | 23. Cart |
| 9. Projection Screen | 24. Storage Cabinet |
| 10. Chalk/tack Surface | 25. Tool Storage Cabinet |
| 11. Instructor Desk and Chair | 26. Industrial Shelving |
| 12. File Cabinet | 27. Cabinet with Sink |
| 13. Student Chairs | 28. Overhead Door |
| 14. Wall Bench Unit | 29. Conference Table and Chairs |
| 15. Fuel and Refueling System | |

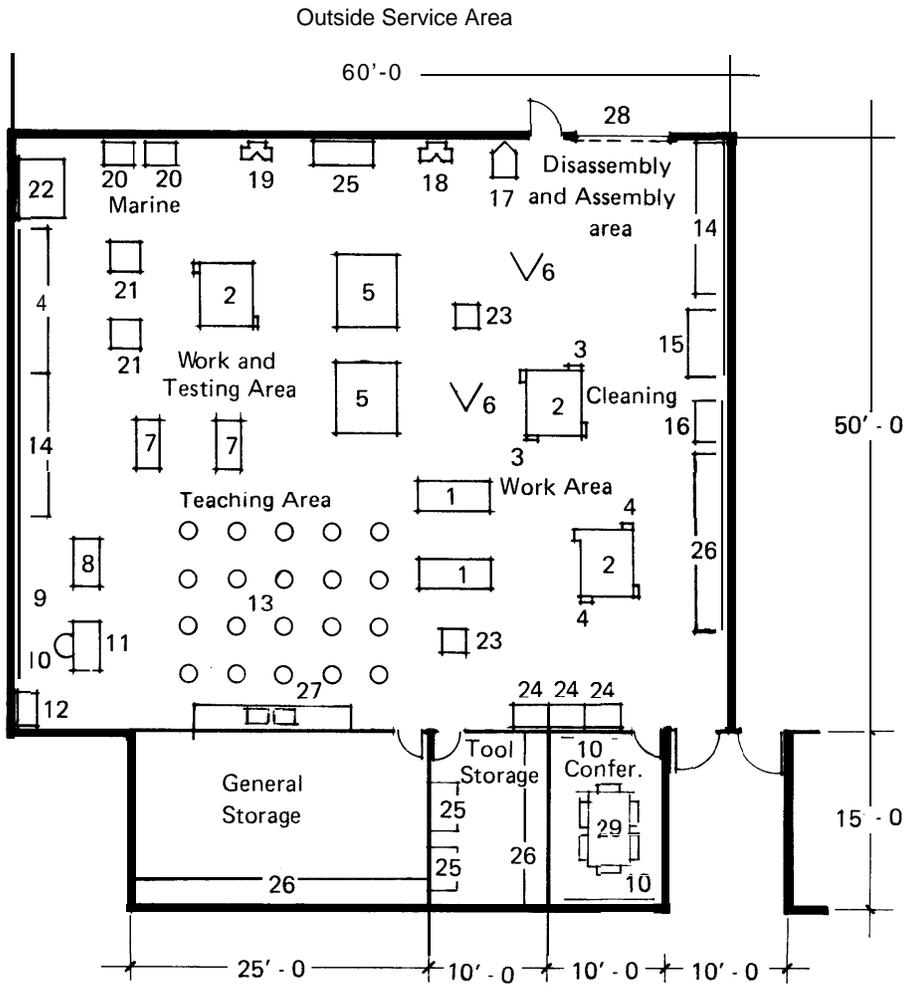


Figure 4-24 Small Engine Repair Shop

4-5 SUPPORT SPACES

Support spaces include staff and student lounges, vending area, training aids preparation, receiving and storage, toilets and janitor closet.

a. STAFF LOUNGE

Use	For informal meetings, coffee breaks, lunch and general relaxation.
Occupant load	6 persons (min)
Space allocation	1.5% of the combined NASF for academic and staff spaces; or 150 NASF (min)
Adjacency relationships	Locate near staff offices and adjacent to vending area.
Layout	See Figure 4-25

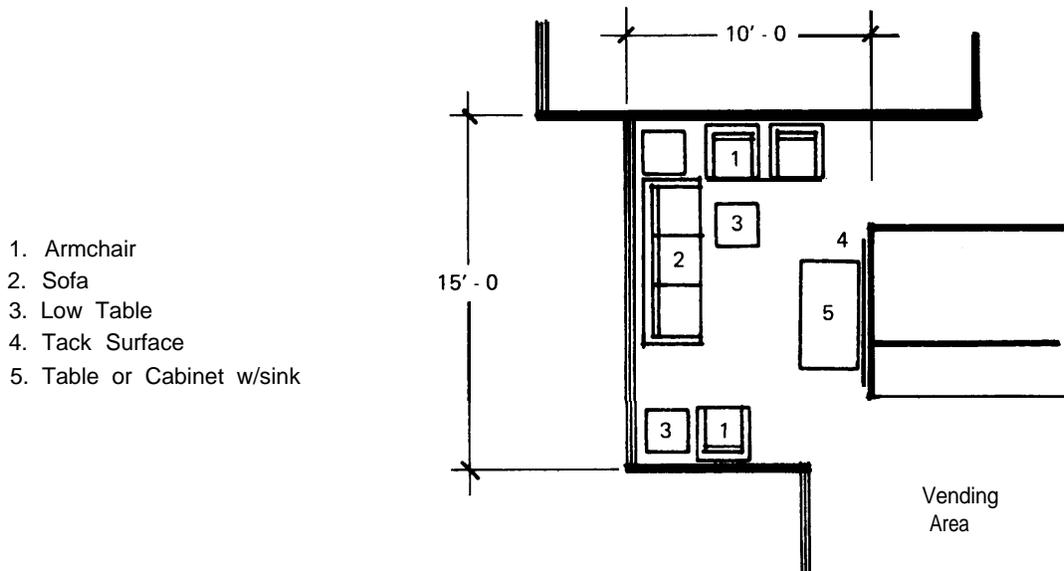


Figure 4-25 Staff Lounge

INDIVIDUAL SPACE CRITERIA

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4-5 SUPPORT SPACES (cont'd)

b. STUDENT LOUNGE

Use	For relaxation during class breaks, lunch hour and unscheduled class time.
Occupant load	18 persons (min)
Space allocation	5.5% of the combined NASF for academic and staff spaces; or 400 NASF (min)
Adjacency relationships	Locate adjacent to the vending area to permit food consumption and alleviate crowding of the vending area during periods of heavy usage. Also locate near the main entrance for convenience of visitors and for visibility. Lounge space may also be dispersed throughout the building. This may be more convenient than a centrally located lounge, and could provide visual interest to the circulation area.
Layout	See Figure 4-26

1. Arm Chair
2. Low Table
3. Table and Chairs
4. Tack Surface

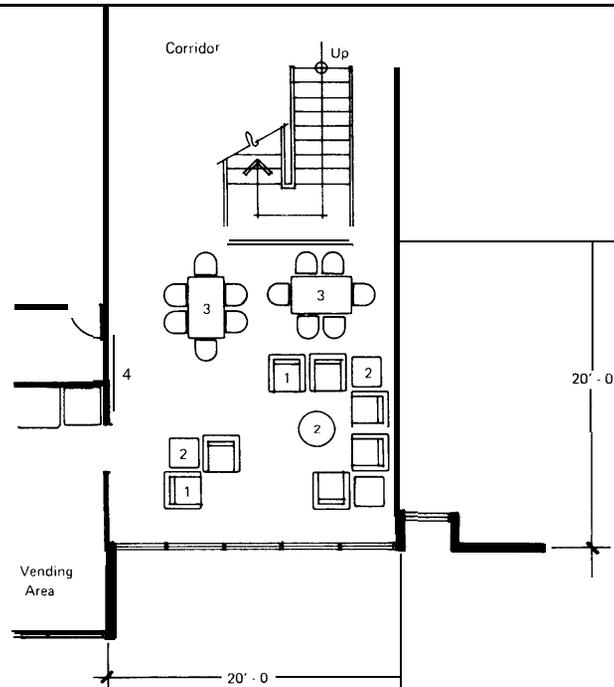


Figure 4-26 Student Lounge

INDIVIDUAL SPACE CRITERIA

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4-5 SUPPORT SPACES (cont'd)

c. VENDING AREA

Use	For vending and consumption of snacks, beverages, cigarettes, candy, etc. A separate space is also needed for storage.
Occupant load	12 persons (min)
Space allocation	3% of the combined NASF for academic and staff spaces; or 300 NASF (min)
Adjacency relationships	Locate adjacent to the student lounge and staff lounge.
Layout	See Figure 4-27

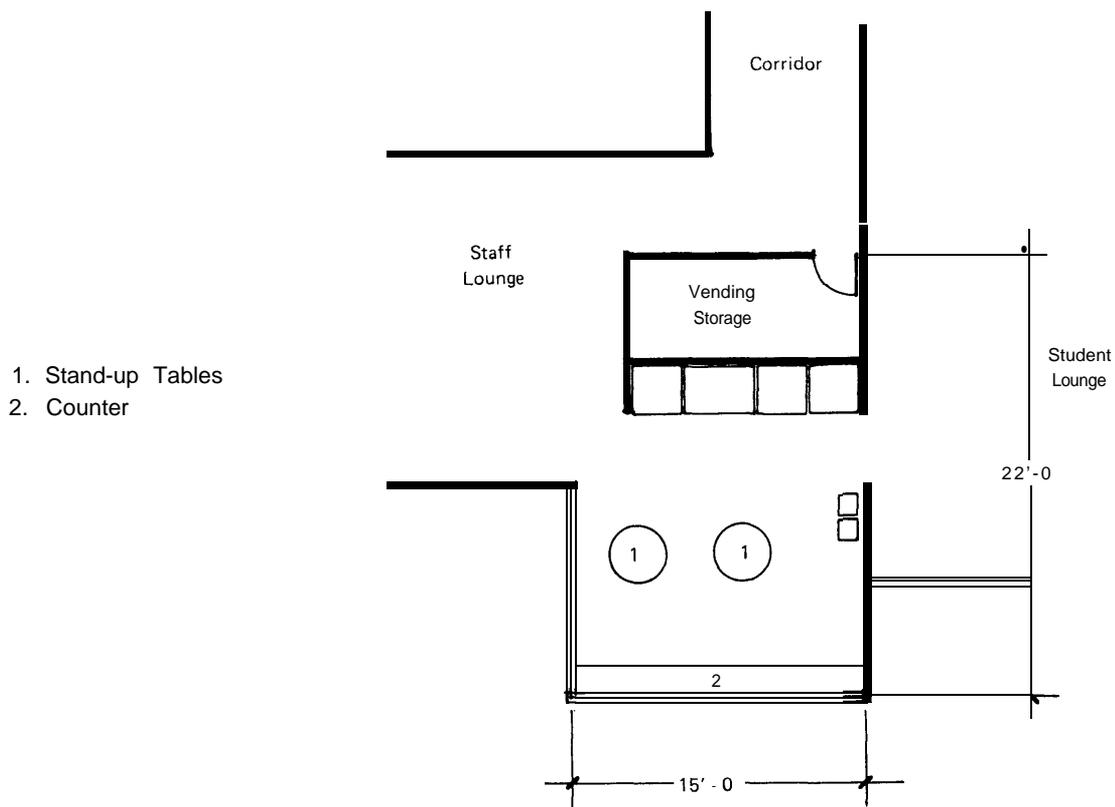


Figure 4-27 Vending Area

INDIVIDUAL SPACE CRITERIA

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4-5 SUPPORT SPACES (cont'd)

d. TRAINING AIDS PREPARATION

Use	For preparation of graphic aids and other material, and for duplication.
Occupant load	4 persons (min)
Space allocation	4% of the combined NASF for academic and staff spaces; or 300 NASF (min)
Adjacency relationships	Locate near staff offices and the receiving room.
Layout	See Figure 4-28

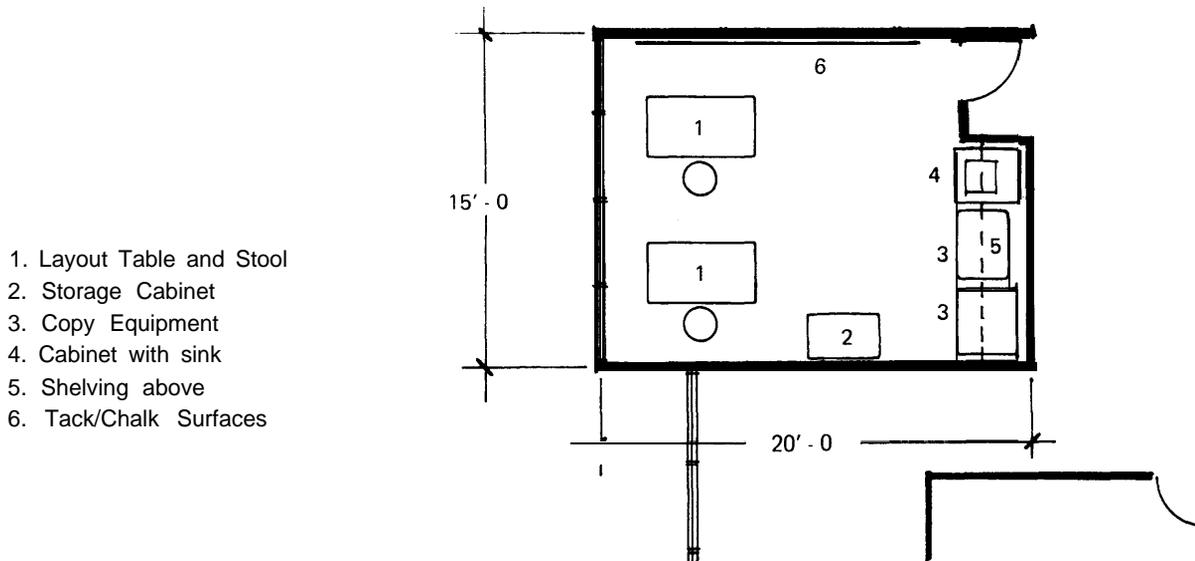


Figure 4-28 Training Aids Preparation

4-5 SUPPORT SPACES (cont'd)

e. TOILETS

Use	For sanitary purposes, shared between students and staff, with separate facilities for men and women. Separate space is required for lockers and showers in toilets serving vocational training space.	
Occupant load	Varies	
Male/Female Ratio	For toilets serving academic spaces, assume 25% utilization by women and 75% utilization by men unless local circumstances indicate otherwise. For toilets, showers and lockers serving vocational training spaces, assume 10% utilization by women and 90% utilization by men unless local circumstances indicate otherwise. Base assumptions on peak occupant loads in the respective areas that the facilities will support.	
Fixture allocation	Water closets	1/40 men 1/25 women
	Urinals	1/40 men
	Lavatories	1/25 men 1/25 women
	Showers	1/15 men 1/15 women
	Lockers	1/man 1/woman
Space Allocation (unit estimates)	Water closet compartment	30 SF
	WC compartment for handicapped	50 SF
	Lavatory	15 SF
	Urinal	15 SF
	Shower compartment	35 SF
	Locker tier (2 lockers/tier)	5 SF
	Detailed provisions for handicapped persons shall conform to current criteria (EM 1110-1-103).	

INDIVIDUAL SPACE CRITERIA

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4-5 SUPPORT SPACES (cont'd)

Adjacency relationships

Locate toilets central to academic spaces and near to the main entrance and lounges. No occupant should have to travel more than 150 feet to reach a toilet facility. Toilets, including lockers and showers, serving vocational training spaces should be convenient to users, both inside and outside the building.

Layout

See Figure 4-29

1. Water Closet Compartment for Handicapped
2. Wheelchair Turn-a-round space
3. Lavatory for Handicapped
4. Urinal for Handicapped
5. Water Closet Compartment
6. Lavatory
7. Urinal

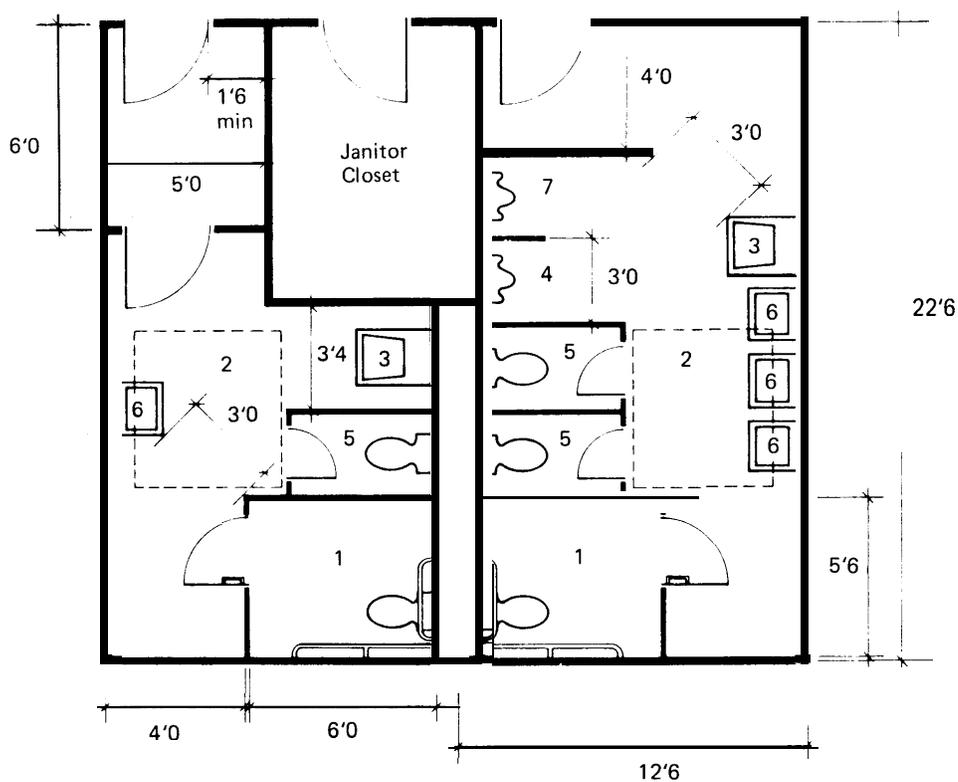


Figure 4-29 Toilets

4-30 SUPPORT SPACES (cont'd)

f. RECEIVING AND GENERAL STORAGE

Use	For receiving, unpacking and temporary storage of educational materials and equipment.
Occupant load	5% of the combined NASF for academic and staff spaces; or 300 NASF (min).
Adjacency relationships	Locate close to an outside service entrance and staff spaces. General storage may be in a separate room but should be adjacent.
Layout	See Figure 4-30

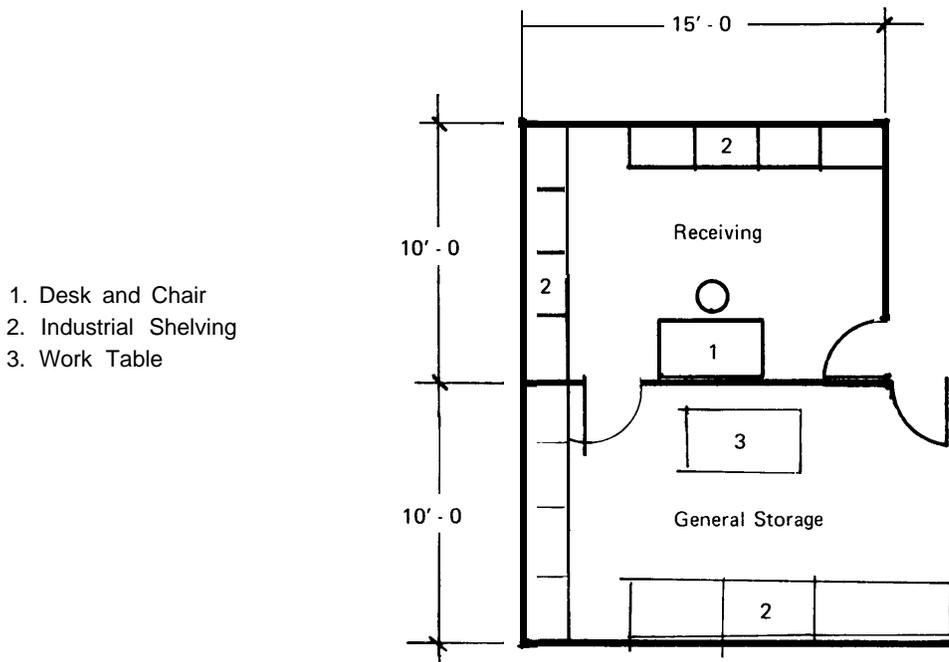


Figure 4-30 Receiving and General Storage

INDIVIDUAL SPACE CRITERIA

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4-5 SUPPORT SPACES (cont'd)

g. JANITOR CLOSET

Use	For housekeeping, preparations and storage of cleaning gear and supplies.
Occupant load	N/A
Space allocation	1% of the combined NASF for academic and staff spaces; or 90 NASF (min).
Adjacency relationships	Locate centrally to minimize walking distances and near toilets. Space may be segmented to other parts of the facility where need exists.
Layout	See Figure 4-31

1. Service Sink
2. Cabinet
3. Shelving
4. Mop Holder
5. Broom Holder
6. Brush Holder
7. Pail Hooks
8. Towel Bars
9. Tack Board

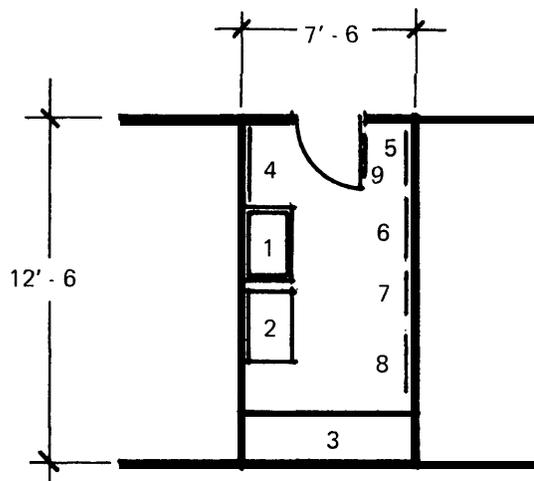


Figure 4-31 Janitor Closet

4-6 SUMMARY OF ENVIRONMENTAL CRITERIA

Table 4-1 covers environmental criteria for each individual space discussed in this chapter.

Table 4-1 Summary of Environmental Criteria for Individual Spaces

SPACE	Max Occupant Load	Mechanical/Plumbing					Electrical					Lighting			Acoustical				
		Thermostat	Air Changes /Hr	CW/HW	Floor Drain	Compress'd Air Exhaust	Intercom	Elec Outlets	PA Speaker	Telephone	Clock	TV/Elec Outlet	Daylight	Blackout Capability	Light intensity FC	Dimming capability Task Light Supplement	Ambient dB	Estimated Peak dB Sound Quality	
Director's Office	1	X	6-8				X	X (6)	X	X	X	X	X	70	0	0	40	75 AVE	
Administrator	1	X	6-8				X	X (6)	X	0	0	0	0	70	0	0	40	75 AVE	
Clerk		X	6-8				X	X (6)	X	0	0	0	0	70	0	0	40	75 AVE	
Typist		X	6-8				X	X	X			0	0	70	0	0	45	75 AVE	
Registrar	1	X	6-8				X	(9) (6)	(9) X	X	0	0	0	70	0	0	45	75 AVE	
Information/Registration		0	6-8	(3)				X	X (8)	0	X			60	X		50	80 ML	
Counselor	1	X	6-8				X	X (6)	X	0	0	0	0	70	0	0	40	75 AVE	
Classroom	25	X	6-8					X	X	0	X	X	X	70	X	0	35	80 ML	
Lecture Room	53	X	6-8					X	X	0	X	X	0	X	70	X	0	40	85 ML
Seminar Room	13	X	6-8					X	X	0	X	X	0	X	70	X	0	40	70 AVE
MOS Library	9	X	6-8				0	(7) X	X	X	X	X	70	0	0	0	40	70 MD	
Self-Paced Instr.	20	X	6-8					(7) X	X	X	X	0	X	70	X	X	35	70 MD	
Language Lab	22	X	6-8					(7) X	0	X	X	X	X	70	X		35	80 MD	
Science Lab	25	X	(1)	X (2)	0	X		X	X	0	X	X	X	X	70	X	X	45	85 ML
Testing Room	50	X	6-8				X	X	X	X	X	X	0	X	70	X		35	75 AVE
Reh/Rec Studio	6	X	6-8					(5) (6)		X	X		X	70	X	X	30	75 D	
Htg/Refrig/AC Shop	20	X	(1)	X	X	X	X	(5)	X	0	X	X	0	70	X		45	90 AVE	
Constr. Electrician	20	X	(1)		X	X		(5)	X		X	X	0	70	X		50	90 ML	
Comm/Indus. Electrician	20	X	(1)		X	X		(5)	X		X	X	0	70	X		50	90 AVE	
Masonry	20	X	(1)	X	X	X		(5)	X		X	X	0	70	X		50	100 AVE	
Carpentry	20	X	(1)	X	X	X		(5)	X		X	X	0	70	X		50	100 AVE	
Plumbing	20	X	(1)	X	X	X		(5)	X		X	X	0	70	X		50	100 AVE	
Diesel Mechanics	20	X	(1)	X	X	X		(5)	X		X	X	0	70	X		50	95 AVE	
Auto Mechanics	20	X	(1)	X	X	X	X	(5)	X		X	X	0	70	X		55	95 AVE	
Welding	20	X	(1)	X	X	X	X	(5)	X		X	X	0	70	X		50	85 AVE	
Auto Body Repair	20	X	(1)	X	X	X	X	(5)	X		X	X	0	70	X		55	90 AVE	
Small Eng. Repair	20	X	(1)	X	X	X	X	(5)	X		X	X	0	70	X	X	45	95 AVE	
Shop Conference Rms	—	X	6-8				X	X	X	0	0	0	0	X	70	X	40	70 ML	
Staff Lounge		0	8-10				X	X	X	X	X	X	X	60	0	0	40	75 MD	
Student Lounge		0	8-10	(3)				X	X (8)	X	X	X	X	60	0	0	40	80 MD	
Vending Area		0	(1)	(4)	X	X		(5)	0				0	70			45	80 ML	
Training Aids Prep.		X	(1)	X		X	X	(5)	X	0	X	X	0	X	70	X	X	40	80 AVE
Toilets			(1)	X	X	X		X	0				0	50	X		50	80 ML	
Receiving/Gen. Stor.		0	6-8				X	X	X	X				50	X		55	70 ML	
Janitor Closet			6-8	X	X			X						50			55	70 L	

(1) 8-10 Air Changes/Hour minimum; exhaust requirements govern
 (2) For emergency shower
 (3) Drinking fountain desirable
 (4) Some vending machines require cold water
 (5) Also as required by equipment
 (6) On/Off, volume control

(7) Also as required for AV carrels
 (8) Pay telephone
 (9) Also for computer terminal

X — Required
 O — Optional