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ABSTRACT

This publication, a supplement to the "North Carolina Public Schools Facilities Guidelines," describes work force development education programs and facilities. It is intended as a resource that can assist design professionals in planning facilities that meet the evolving needs of public schools in the state. The first part of the guide provides general information on facilities design, including the following: background and overview; work force development education; using the guidelines; facility design; flexibility and expandability; work force development education spaces such as classrooms, laboratories, teacher work stations, storage areas, and outdoor spaces; shared spaces; space location; lighting; electricity; and security and safety. The second section of the guide provides program-specific information for facilities for the following courses: agricultural education, business education, career development, family and consumer sciences education, health occupations education, marketing education, technology education, and trade and industrial education. The last section lists seven resources. (KC)

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FOREWORD

Workforce Development Education comprises a unique but integral component of the North Carolina Standard Course of Study for grades six through twelve. Similarly, facilities which effectively support the workforce development education curriculum must interrelate with the overall school design while addressing the peculiar requirements of laboratory-oriented instruction.

The accelerating pace of technological change, which has characterized the emergence of the Information Age, dictates flexibility and innovation in the design of instructional programs and the facilities within which they will be implemented. Some schools designed and constructed during the previous two decades may already be dated, in terms of maximizing their educational potential. Public school facilities which provide requisite flexibility while maintaining long-term economy and useability are essential to achieving progressive educational agendas.

This publication describes workforce development education programs and facilities and is a supplement to the *North Carolina Public Schools Facilities Guidelines*. It is intended as a resource which can assist design professionals to plan facilities which meet the evolving needs of public schools in North Carolina. We hope that you will find it useful.

Jay M. Robinson

Jay Robinson, Chairman
State Board of Education

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INTRODUCTION

BACKGROUND AND OVERVIEW

Today's workplace is both international and dynamic in nature. The worldwide scope of the marketplace and rapidly advancing technology have precipitated a state of flux in the job market and in the menu of products and services which it produces. Programs and processes which ensure an adequately prepared workforce must parallel this accelerating evolution.

Workforce development education programs in the public schools comprise a major partner in the overall training collaboration. The Bureau of Labor Statistics (1994) indicates that by the year 2000, only 15% of available jobs will be unskilled (down from 60% in 1950), while 65% will require specific skills demanding specialized training (up from 20% in 1950). There will be a 16% growth in jobs which require at least a high school education, while for the 18 million college graduates expected to join the labor force between 1992 and 2005, only about 14 million jobs requiring college experience will be available--even though the size of the 16 to 24-year-old labor force is expected to continue to increase. While entry-level job opportunities for high school graduates are likely to increase, entry-level workers may soon be in short supply.

The N.C. Alliance for Competitive Technologies (1995) notes that only 25% of the state's high school graduates actually obtain college degrees, with another 25% receiving some training beyond high school. The three out of four students who will not complete baccalaureate degrees but who will comprise a crucial element of the workforce constitute one major focus of high school curricula. With a substantial majority of high schools in the state currently utilizing block scheduling (fewer daily class periods, but of longer duration), students will have opportunities to enroll in greater numbers of non-academic classes; consequently, enrollment in these elective programs can be dramatically increased.

The need to prepare students to succeed in the workplace and the importance of workforce development education programs are clear. Less clear are the precise shapes and forms of programs which can best accomplish this objective. In some instances, more traditional "vocational/technical" programs housed within the facility proper provide viable approaches, although in certain cases sophisticated technology may supplant some of the heavier or more expensive equipment used in the past. Certainly, work-based learning initiatives such as internships, cooperative education, and apprenticeship programs represent a growing segment of the workforce development effort. Career

centers serving the training needs of students from multiple high schools and comprehensive technical high schools are becoming more common, as are collaborative programs among secondary schools and community colleges.

The most effective facility plan will reflect a marriage of sound program planning by the school system and knowledgeable, inventive application of design principles by the design professional, and will embody flexibility sufficient to sustain current and emerging approaches to workforce development in the school setting. These guidelines are intended to enhance that endeavor.

WORKFORCE DEVELOPMENT EDUCATION

Workforce Development Education, formerly referred to as occupational or vocational/technical education, comprises a spectrum of instructional programs in grades six through twelve designed to help empower students for effective participation in an international economy as world-class workers and citizens. Specific objectives of Workforce Development Education include: 1) assistance in making educational and occupational decisions; 2) reinforcement and application of related learnings from other disciplines; 3) preparation for initial employment; 4) preparation for further vocational and technical training; and 5) preparation for making informed consumer decisions and applying practical life skills.

Middle school (grades 6-8) workforce development education programs are generally exploratory in nature and focus on career guidance and decision making. Notable exceptions are certain business education courses, such as Keyboarding, which are designed to develop specific skills. As a rule, instruction involves multiple student activities and career simulations but requires little of the heavy-duty equipment often found in junior high school vocational labs of the past. A significant portion of the instruction is computer based. Middle grades workforce development education courses are offered in Agricultural Education, Business and Marketing Education, Career Development, Family and Consumer Sciences Education, and Technology Education.

High school (grades 9-12) workforce development education programs are generally designed to develop specific career-related skills. Instructional laboratories are likely to replicate, to varying degrees, actual workplace environments related to careers or groups of careers. While contemporary versions of traditional equipment are likely to be in use, a trend toward high-technology programs and equipment and simulated systems is evident in both laboratory and classroom settings and a significant portion of the instruction may be computer based. High school workforce development education courses are available in Agricultural Education, Business Education, Career Development, Family and Consumer Sciences Education, Health Occupations Education, Marketing Education, Technology Education, and Trade and Industrial Education.

USING THE GUIDELINES

This publication is intended as a reference document for designers of school facilities. Its purpose is to provide concise descriptions of workforce development programs and the facilities which support them. It is neither comprehensive nor all-inclusive, but provides for the user an initial understanding of the nature and purposes of instructional programs around which facility designs may evolve. The guidelines in no way supersede state or local codes or regulations nor federal or state legislation regarding building design and construction, access, safety, or other pertinent issues.

Some aspects of all workforce development education programs and facilities are similar in nature and are described in the introductory portions of this guide. Subsequent sections focus on the peculiar requirements of individual courses or program areas. Sample floor plans supplement and clarify printed descriptions and are not intended for direct replication within facility designs.

As a design takes shape, it is likely that additional, more detailed information will be needed about the programs, equipment, and purposes which will function within the facility. Several publications which should prove useful are listed in the ***Additional Resources*** section near the end of this publication. In addition, staff consultants with the Workforce Development Education Section of the North Carolina Department of Public Instruction are available to discuss areas of concern and may be contacted by phone at (919)715-1620.

FACILITY DESIGN

Designing school facilities challenges the collective planning skills and creativity of educators and design professionals. Providing desirable learning environments for the myriad of ever changing workforce development education programs introduces particularly complex issues into that collaboration. At least two unique characteristics of workforce development education facilities emphasize the importance of good design decisions.

The first characteristic is the high cost of space and equipment, relative to that of most other teaching stations in a school. The required volume of space for some laboratories may exceed six times that for an academic teaching station, while equipment costs for a program such as Metals Manufacturing may be more than a hundred times greater.

Second is the inflexibility of some laboratory designs. Facilities for some trades programs, for example, require a large floor area with a high ceiling and special wiring, plumbing, air handling, and acoustical treatment. Such facilities may be very expensive to renovate and poorly located for some other uses. In general, laboratories can more easily be converted to other types of laboratories than to spaces for academic use.

This section identifies design considerations which are common to most workforce development education facilities. Requirements for individual facilities are described in a subsequent portion of the publication.

FLEXIBILITY AND EXPANDABILITY

Flexibility is an important concept in facility planning. While standard classrooms are often utilized during each period of a day, laboratories designated for more specific purposes may be used only during certain class periods.

A modular system of layout will permit the greatest possible exchange of work stations and other facilities. Lighting, heating, air conditioning, and ventilation should also be designed on a modular basis which will allow spaces to be reduced or expanded without affecting the environment. The use of non-load-bearing partitions between adjoining areas will increase the flexibility of laboratory areas. Utilities should be positioned on permanent walls and structural components.

Doors should be limited in size to accommodate the largest anticipated pieces of equipment and should be placed with an eye to providing maximum future flexibility relative to the relocation of partition walls. Where facilities are likely to be used during

evening hours, entrance and toilet locations should preclude the necessity to open or light other portions of the building.

Future expansion which is planned using multiples of needed work stations rather than general square footage to be added can extend the useable life of a facility and more simply accommodate changes in programs and curricula. The overall facility should be configured to the site to minimize restrictions to future additions and to minimize renovation to an existing building when an addition is attached.

WORKFORCE DEVELOPMENT EDUCATION SPACES

Classrooms

Each program will require access to classroom space sufficient for anticipated student enrollments. Classrooms will serve as assembly areas where students may receive group instruction, plan, or use reference and audiovisual materials. In situations where several laboratories are located in proximity and classrooms are shared, assembly areas should be considered for each lab. Such assembly areas may require as little as 300 square feet of space, a chair for each student, and a dry marker board.

Classrooms for grades six through eight should contain a minimum of from 850 to 1,000 square feet; classrooms for grades nine through twelve should contain a minimum of from 750-850 square feet. Where classrooms serve double duty as labs, such as in Exploring Career Decisions (middle grades) or Marketing Education (high school), additional area will be required. Classrooms smaller than 1,000 square feet should not exceed a 3:2 length-to-width ratio, with a minimum width for any such space of 24 feet. Minimum ceiling heights of 9'-4" for spaces of 850 square feet or less and 10'-0" for all others are appropriate. If a school store is a part of the Marketing Education program, up to 500 additional square feet may be needed. A separate student conference area may be appropriate for programs in which school-to-work initiatives require frequent student and employer conferences.

The typical classroom space should have dry marker and tack boards, adequate seating equipment, a demonstration table, teacher desk, and at least one drafting table for planning. Tables and chairs are appropriate for student seating. Ample storage for audiovisual equipment and materials, printed instructional resources, and teacher and student files should be provided. A minimum of one permanently-mounted television monitor should be provided. Classrooms should be equipped with computers or with conduits for future installation of computers and other communications cabling. (Head-end equipment will be located elsewhere in the facility.) Room size should be increased

by 15 to 20 square feet per computer. A communications system, to include a telephone, should be provided for informational and emergency use. Where feasible, a display case located to permit viewing from an outside corridor is a plus.

In individual classes where some students will be working in the classroom at the same times others are working in the lab, windows are needed between the two spaces to permit teacher supervision. Windows should provide a clear but protected view of the lab area and should contribute to acoustically insulating the classroom from the lab. Natural light must be controlled to permit the use of television and other audiovisual media.

Exterior classroom windows should equal at least six percent of the floor area, with a minimum of one which can be used for ventilation or emergency rescue. This window should be operable from the inside and provide minimum clear opening dimensions of 24 inches and 5.7 square feet. Maximum sill height should be 32 inches in grade six and 44 inches in grades seven through twelve. An exterior door may be substituted for this window. Classrooms without an exterior wall may be windowless (exterior), where interior windows into a laboratory provide an ample daylight source. Windowless (exterior) classrooms should provide secondary access, either directly or through an adjoining room, to an exit corridor which is separated by one-hour rated construction from the primary exit corridor.

Laboratories

Workforce development education labs are custom designed for specific classes or programs and provide work environments in which practical applications of instruction and skills practice may be accomplished effectively and safely. Floor area is dependent upon the peculiar purposes and nature of instruction; however, a minimum of 100 square feet per individual, exclusive of storage and other support areas, is generally a good planning figure. Minimum ceiling heights should be 12'-0" for labs which are 2,000 square feet or smaller and 14'-0" for others. Each lab area should be equipped with a communications system, to include a telephone, for informational and emergency use.

Carpeting is an appropriate floor treatment for light-duty labs and in areas where noise control is desirable, such as Marketing, classroom sections of Health Occupations, Business, and Family and Consumer Sciences Education, and in certain other programs such as drafting. Vinyl tile is effective for light-duty areas, such as consumer cooking, graphics, and electronics, where maintenance is likely to be an issue. Ceramic or quarry tile is appropriate for commercial cooking. Medium to heavy-duty labs generally have hardened, sealed concrete floors, as they are sometimes subjected to abuse from heavy objects and may become impregnated with oils or acids. Floor drains are needed in areas where liquids are frequently spilled or where floors must be scrubbed or hosed down. Where spillage of volatile liquids is likely, drains should have suitable interceptors.

Tool and supply storage should be located convenient to work areas so that a minimum of travel and congestion results. Wide aisles should be positioned between work stations, in front of storage cabinets, and around equipment. Equipment such as lathes, planers, or presses which have a tendency to vibrate should be bolted to the floor. Mounting pads placed under the machine feet will also reduce vibration.

Machines and equipment should be located to allow for ease of cleaning around the base, and cabinets should fit flush to walls or be trimmed to fit flush for the same purpose. In areas where high levels of dust are generated, walls should be smooth with no ledges to collect the dust. Laboratories which generate excessive dust or other airborne pollution must have an exhaust system.

Windows in a laboratory can provide natural lighting which, at times, may be sufficient for student activities and thereby reduce energy costs. Natural lighting may also be of value in circumstances in which color distortion from artificial lighting is an issue and during egress from the building due to power failures. Windows are necessary in rooms in which hazardous equipment is operated. Natural ventilation may be sufficient during much of the school year, can reduce energy costs, and is useful when mechanical systems fail.

Windows may not be practical in medium and heavy-duty labs or where expensive equipment or tools are housed, due to the possible security issues they generate. If regular windows are impractical, consideration may be given to small windows high above the floor, which can be inoperable and glazed with wire glass or covered with grilles.

Windows should be placed a minimum of 48 inches above the floor; 72 inches where wall space is valued. If windows are used, orientation of the building on the site should reduce glare.

Teacher Work Stations

Each teacher should have a work station which comprises, as a minimum, an adequately lighted desk-height work surface with computer terminal and telephone, a chair, a legal-size file cabinet, and a locker for the storage of teaching materials and personal items. In general, teacher work stations may be located in a common area. Private offices may be justified in certain circumstances, such as where student work supervisors will be called on a frequent basis.

Work areas should be equipped with shelf space for books and other printed material and storage for audiovisuals and other teaching aids. One or more tables with chairs can contribute to the flexibility and utilization of the area. Teacher workrooms for the preparation of instructional materials should be located adjacent to the work stations area.

Storage Areas

Storage is required for tools, materials, student work pieces, and teacher materials and supplies. Where shop facilities are shared among programs, independent storage areas suitable for each program will generally be needed. If adult classes utilize a facility, independent storage may also be justified. Storage rooms may be used to isolate noisy laboratories from adjacent quiet areas.

Inexpensive tools, equipment, or utensils which receive frequent use are often stored in wall panels or cabinets for easy accessibility and inventory. More expensive items, especially those which are only used occasionally, will require a lockable storage room or cabinet.

Materials storage requirements will vary with the types of activities but should be located convenient to the materials receiving door and in a location which provides an orderly flow of materials into the work area. Storage should be designed to accommodate materials. For example, lumber usually comes in lengths of up to 16 feet, while steel stock is 20 feet in length and steel pipe is 21 feet long. For security reasons, tool and materials storage rooms should not have windows or skylights. Masonry wall construction and doors without louvers also are appropriate.

Students will often need lockers or trays for storing small work pieces, but a storage room or area may be required for larger items. There may be some advantage to dividing such storage areas into class-size lockers, since students are less likely to vandalize or steal work pieces from their classmates.

Each teacher will need a lockable storage cabinet or closet for securing instructional materials and aids in the laboratory. This is particularly true where the permanent teacher work station is located in a common area not contiguous to the lab.

Outdoor Spaces

Spaces outside the building are essential to the successful implementation of certain workforce development education programs, either as staging or instructional areas. Such spaces will be tailored to the curriculum of selected courses or programs and, while an integral part of the facility design, may not occur in proximity to the building proper. Examples of outlying spaces include land labs, nature trails, greenhouses, and temporary sites for the construction of live projects.

SHARED SPACES

Flexibility encourages space sharing which can increase utilization and reduce costs. A single classroom, as an example, may serve two or more laboratory programs. A second means of increasing flexibility is through the sharing of special equipment or areas. For example, a welding area might be shared by agricultural and automotive programs. A third method requires that a single laboratory be used for several purposes, but with materials and storage rooms for each. An additional approach is for multiple laboratories to share a common work or fabrication area.

Space sharing should not necessarily be confined to workforce development education. A greenhouse, for example, might be shared by Science and Horticulture; a general work area by Drama and Carpentry.

Shared curriculum support areas such as conference rooms, career resource rooms, and computer labs offer other venues for efficiency in design. Also, dressing rooms, showers, and clothing locker areas, where required, may often be shared effectively.

SPACE LOCATION

While some workforce development education spaces have traditionally been located in separate buildings, educators often feel that a separate building implies that things vocational and things academic are worlds apart. A compact building, with workforce development education classrooms and laboratories integrated into the main school plant, is consistent with the philosophy of integrated instructional approaches. Energy conservation and the trend toward air conditioned lab areas also support facility integration.

Certain courses or programs lend themselves functionally to location in proximity to related academic and support areas. As examples, Exploring Career Decisions is career guidance in nature and a low-noise program and may appropriately be located near the guidance and media areas of the school. Marketing programs, especially where the operation of a school store is a part of the program, may be located toward the main entrance or contiguous to major student circulation areas. Business and computer related programs may be located in areas which maximize student access from all areas of the school. Exploring Biotechnology classes can fit well near a biology laboratory. Where noise, safety, and access issues are not prohibitive, a careful study of interrelationships among workforce development and other courses in the school curriculum can result in prudent and economical location of spaces.

Noise and vibration and air quality may be of concern in the location of medium to

heavy-duty laboratories, as may requirements for special utilities, outside work areas, and service drives. Care should be taken to locate such facilities where they will not limit or complicate the expansion of quite areas of the building, but sites requiring long service drives which wrap around the building or separate the building from play or parking areas or other buildings should be avoided.

LIGHTING

Since workforce development education laboratories may often be used at night, an artificial lighting system which provides a uniform distribution of shadow-free, glare-free illumination is required. In addition to ceiling-mounted fixtures, supplemental lighting may be necessary for some pieces of equipment. Illumination levels will vary with activities, but in general 60-70 foot-candles is appropriate for classrooms and general laboratory areas and 100 foot-candles is adequate for laboratories where close work is conducted.

ELECTRICITY

An electrical system for a laboratory should be planned only after identification of the equipment and where it is to be located. The assumption should also be made that changes will occur from time to time in the use of the facility.

Duplex receptacles (120-volt) should be located at 12-foot intervals on perimeter walls and should be placed 48 inches above the floor. Double duplex outlets should be located on columns. Where debris on the floor is common, outlets should be mounted in cast boxes on rigid conduit at least 12 inches above the floor. Outlets which must be placed on the floor under student furniture should be in surface-mounted, tombstone fixtures.

In medium to heavy-duty shops where equipment is often driven by electric motors, 208 or 240 volt three-phase current should be provided. Magnetic switches should be installed on equipment with large motors. Where flexibility in equipment location is desirable, overhead drop cords are generally more feasible than the more expensive overhead bus duct system. The instructor will need to be able to disconnect each piece of equipment from its power source; therefore, the use of outlets for each machine is appropriate.

As a safety factor, the instructor should be able to disconnect and lock the electrical service to all equipment from a master panel which is easily accessible. All machinery should be coded at the power panel so the circuit can be killed quickly in an emergency. Automotive or other shops where volatile liquids or vapors will be present will require special safety considerations. State building codes should be consulted.

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SECURITY AND SAFETY

Security of workforce development education facilities and equipment is of primary concern from economic, accountability, and liability perspectives. Controlled access to classroom, file server, laboratory, and support areas should be assured in the design of the facility.

No consideration in facility planning is more important than safety. While various points related to safety are alluded to throughout this publication, the following are specific points to be considered.

1. Machinery should be located to allow the operator protection from traffic patterns.
2. Kick-back areas for machines should be oriented away from student work areas.
3. Electric equipment should not be located near sinks or water fountains.
4. Welding booths and curtains should be fire proof or fire resistive. Exhaust hoods be provided in welding areas. Curtains on booths should adequately screen the welding area.
5. An engine exhaust system should be provided in automotive areas.
6. Motors, switches, and electric fixtures located in spray booths should be explosion-proof.
7. U.L.-approved safety containers should be provided for flammable liquids and rags.
9. Storage cabinets for eye protection devices should be provided.
10. Eyewash fountains should be provided where students or staff are likely to get chemicals or debris in their eyes. Emergency showers may be needed in some areas.

School planners should keep abreast of current statutes and codes related to building and occupant safety as they relate to the design of workforce development education programs and facilities.

PROGRAM FACILITIES

AGRICULTURAL EDUCATION

PROGRAM OR COURSE TITLE(S): Exploring Biotechnology **(Middle grades)**

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To explore the interrelationship of science and technology and their impact on agricultural products and services.
2. Types of Instruction:
   Lecture; demonstrations; individual and small-group projects; field trips; shadowing; independent inquiry
3. Typical Activities:
   Classroom instruction; individual and small-group projects; conducting business meetings; greenhouse experimentation; land laboratory experimentation
4. Maximum Recommended Class Size: 18
5. Typical Length of Class Period: 55 minutes
6. Typical Duration of Course: Semester

RATIONALE FOR PROGRAM SELECTION:

Provides an understanding of research involving plants, animals, food science, and the environment (including economic and global concepts) and may be integrated with science and other programs.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Should be located at ground level, to accommodate outside program components, and in proximity to other workforce development programs. Proximity to science or guidance facilities may be desirable.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   Agricultural Work Development
2. Other Elective:
   N.A.
3. Academic:
   Science

SPACE REQUIREMENTS:

1. Square Footage Range: 1,400-2,000

2. Peculiar Needs:
   A. Networked computers (school and Internet)
   B. Greenhouse center (small attached) or optional separate greenhouse (minimum of 1,056 square feet)
3. Special Conditions:
   N.A.
4. Flexibility Needs:
   Student furniture should be easily rearranged

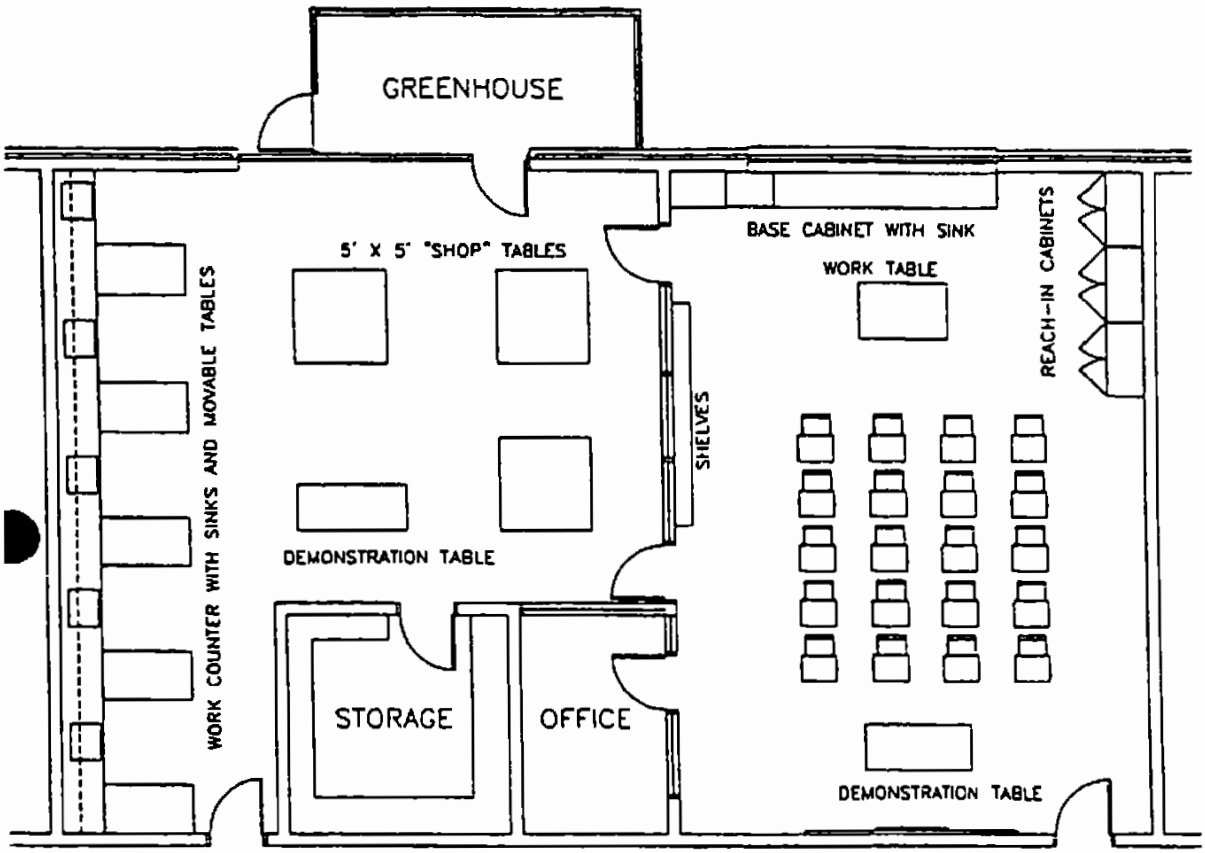
FURNISHINGS AND EQUIPMENT:

1. Typical Furniture:
   A. Student tables and chairs in lieu of desks
   B. Teacher desk and file cabinets
   C. Teacher demonstration tables
   D. "Shop"-type work benches
   E. Student work tables
2. Typical Casework:
   A. Base cabinet with sink (hot and cold water supply) in classroom
   B. "Science"-type base cabinets with deep sinks (hot and cold water supply)
   C. Storage cabinets with adjustable shelves over base cabinets
   D. Full-height storage cabinets in classroom
3. Typical Equipment:
   A. Inside plant growth chamber
   B. Microscopes and other small laboratory equipment
   C. Aquarium

SPECIAL NOTES:

1. Laminar flow hood
2. Fume hood
3. Emergency eye wash
4. Emergency shower
5. Overhead mirrors at demonstration tables
6. Telephone for teacher
6. Access to electrical supply in open floor areas
7. Greenhouse oriented for southern exposure
8. Adequate ventilation systems
9. Emergency disconnect switch for all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.


GREENHOUSE
5' X 5' "SHOP" TABLES
BASE CABINET WITH SINK
WORK TABLE
REACH-IN CABINETS
WORK COUNTER WITH SINKS AND MOVABLE TABLES
SHELVES
DEMONSTRATION TABLE
STORAGE
OFFICE
DEMONSTRATION TABLE

(Not to scale)

PROGRAM AREA: Agricultural Education

PROGRAM OR COURSE TITLE(S): Agribusiness
Agricultural Engineering Technology
Agricultural Production and Management
Agricultural Work Development

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   A. Agribusiness
      To focus upon the broad field of agribusiness management and related careers.
   B. Agricultural Engineering Technology:
      To develop knowledge and technical skills in the broad field of agricultural machinery and equipment, metal fabrication, and structures.
   C. Agricultural Production and Management
      To focus upon the scientific principles and processes related to the production of plants and animals for the food and fiber system.
   D. Agricultural Work Development
      To provide on-the-job training in agricultural and related fields.
2. Types of Instruction:
   Lecture; demonstration; computer application; independent inquiry; small and large-group learning; field trips; shadowing; land laboratory and greenhouse; conducting business meetings
3. Typical Activities:
   Classroom instruction; conducting business meetings; computer application; role playing; independent and small-group project construction; greenhouse, forestry, and land laboratory demonstrations
4. Maximum Recommended Class Size: 20
5. Typical Length of Class Period: 90 minutes (block schedule); 55 minutes (traditional)
6. Typical Duration of Course: Semester (block schedule); Year (traditional)

RATIONALE FOR PROGRAM SELECTION:

1. Agribusiness:
   Examines basic and advanced levels of business management, with emphasis on sales, marketing, entrepreneurship, communication, leadership, information technology, and record keeping.
2. Agricultural Engineering Technology:
   Provides fundamental technology training related to the broad field of agriculture and including agricultural mechanics safety; tool selection, use, and safety; human resource and leadership development; electrical wiring; metalworking; plumbing; concrete; carpentry; and career opportunities.
3. Agricultural Production and Management:
   Provides a basic understanding of the livestock and poultry industries, plant and soil sciences, agricultural machinery and safety, wildlife habitats, environmental

stewardship, the global agricultural industry, and leadership and personal development.

4. Agricultural Work Development:

Provides a basic understanding of the world of work and the training needed for a career in agricultural occupations, with emphasis on employability skills outlined in the SCANS report.

PROGRAM LOCATIONS AND RELATIONSHIPS

Should be located where noise and distractions created by the movement of students and equipment to and from the building will not interfere with other school activities.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   - Agriscience Applications
   - Environmental and Natural Resources Studies
2. Other Elective:
   - Related "shop"-type courses, such as Metals Manufacturing Technology
   - Certain business education courses (classroom only)
3. Academic:
   - N.A.

SPACE REQUIREMENTS:

1. Square Footage Range: 2,800 - 3,200 (exclusive of classroom and optional greenhouse and slathouse)
2. Peculiar Needs:
   - A. Computers should be networked (local and Internet)
   - B. Greenhouse (minimum of 1,056 square feet, with 500 square-foot headhouse) for Agricultural Production and Management only
   - C. Finishing room
   - D. Small engine and mower storage area
3. Special Conditions:
   - Paved and covered outside work apron
4. Flexibility Needs:
   - A. Student furniture should be easily moved for frequent rearrangement
   - B. Overhead door should accommodate the tallest equipment which will be serviced

FURNISHINGS AND EQUIPMENT:

1. Typical Furniture:
   - A. Individual student tables with chairs
   - B. Teacher desk with two file cabinets
   - C. Demonstration table with overhead mirror
2. Typical Casework:
   - A. Computer counter as indicated
   - B. Open-face overhead cabinets above computer counter, where possible
   - C. Full-height storage cabinet in classroom

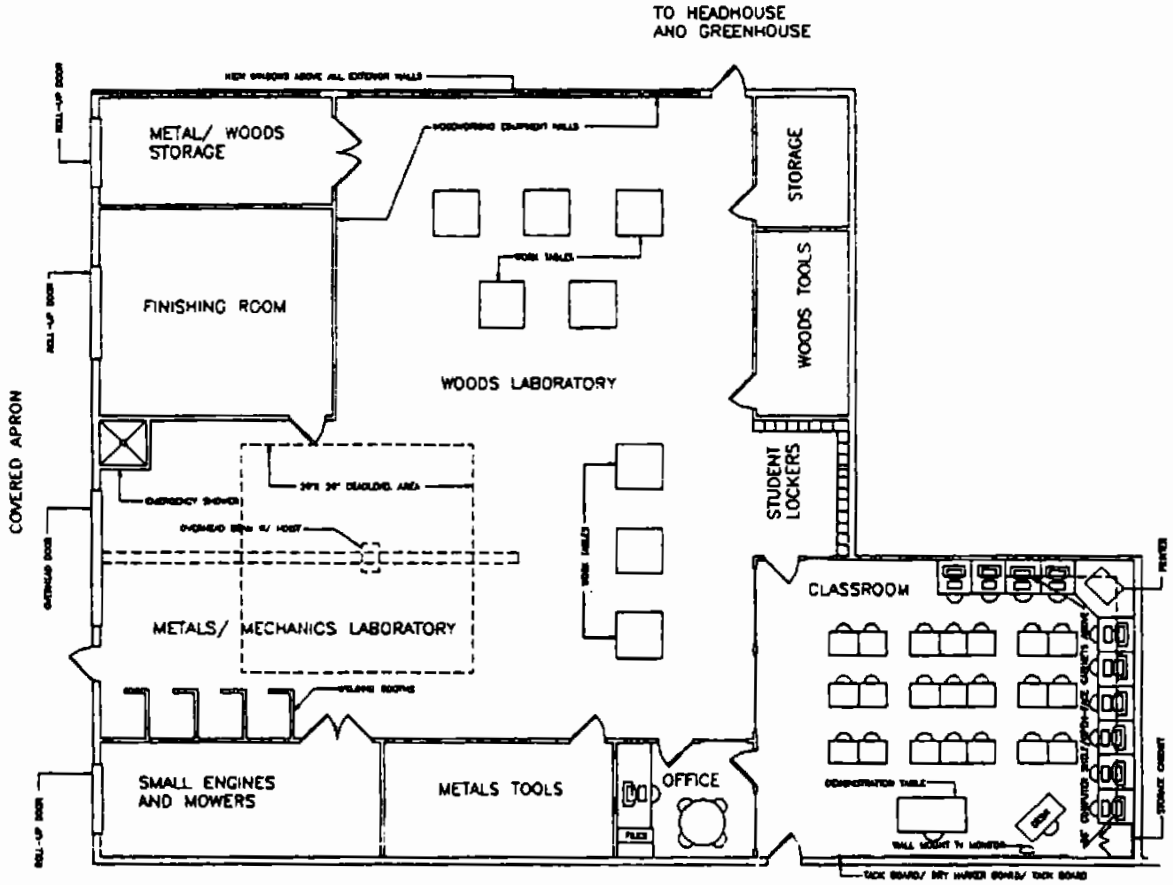
3. Typical Equipment:
   A. Large, stationary wood and metalworking equipment
   B. Small hand and portable power tools
   C. Dry marker and tack boards
   D. Ceiling-mounted audiovisual screen
   E. Computers and printer

SPECIAL NOTES:

1. Deep sink with hot and cold water supply and emergency eyewash
2. Telephone for teacher and student consultation with employers
3. Adequate ventilation and dust control for laboratory areas
4. Overhead access to electric power in open areas of shop
5. Electrical receptacles where possible on perimeter walls of classroom and laboratories
6. 20' x 20' dead level area inside laboratory contiguous to overhead door
7. Overhead rail with heavy-duty electric hoist at dead level area
8. Greenhouse should be situated for best southern exposure
9. Both greenhouse and slathouse should be enclosed with security fence
10. Emergency disconnect switch to all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

Agribusiness (classroom only)
Agricultural Engineering Technology
Agricultural Production and Management
Agricultural Work Development (classroom only)



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PROGRAM AREA: Agricultural Education

PROGRAM OR COURSE TITLE(S): Agriscience Applications
Horticulture
Environmental and Natural Resources Studies
Biotechnology and Agriscience Research

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   A. Agriscience Applications:
      To integrate biological and physical sciences with technology, as they relate to natural resources, food production, agribusiness, and the environment.
   B. Horticulture:
      To provide and expand instruction in the broad field of horticulture, with emphasis on the scientific and technical knowledge for a career in the horticulture industry.
   C. Environmental and Natural Resources Studies:
      To provide and expand instruction to environmental studies and natural resources management.
   D. Biotechnology and Agriscience Research
      To focus and expand upon the knowledge and skills needed to understand scientific methods and processes applied to food, fiber, and environmental systems, with emphasis on computation and communication skills
2. Types of Instruction:
   Lecture; demonstrations; independent inquiry; small and large-group projects; field trips; shadowing; outdoor laboratory experiences; greenhouse instruction
3. Typical Activities:
   Classroom instruction; independent and group laboratory and greenhouse instruction and experimentation; conducting business meetings; outdoor laboratory experiences; maintenance of small and large equipment; teacher and student demonstrations
4. Maximum Recommended Class Size: Agriscience Applications: 18
   All others: 20
5. Typical Length of Class Period: 90 minutes (block schedule); 55 minutes (traditional)
6. Typical Duration of Course: Semester (block schedule); Year (traditional)

RATIONALE FOR PROGRAM SELECTION:

1. Agriscience Applications:
   Provides an awareness and understanding of the FFA and agricultural leadership, food science, natural resources and the environment, science, agribusiness, and employability skills.
2. Horticulture:
   Provides broad information about the horticulture industry through an understanding of plant identification, growth, development, and nutrition; media selection; pest management; chemical disposal; landscape design; lawn and turfgrass

management; career opportunities; customer relations; and leadership development.

3. Environmental and Natural Resources Studies:

   Provides entry-level skills in natural resources and environmental occupations through an understanding of renewable and non-renewable resources; air, water, and environmental quality; aquaculture; erosion; forests and forestry; and wildlife habitat.

4. Biotechnology and Agriscience Research:

   Provides a basic understanding of research related to plants, animals, food science, and the environment. Technical and communication skills are emphasized in assessing the performance of plant and animal field trials, DNA transformation, protein assays, and enzyme activity detection.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Courses require frequent instructional activities in environmental/biotechnology laboratories and greenhouses. Facilities should be located with direct access to outside spaces and where noise and the movement of students will not interfere with other school activities.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   Agricultural Work Development
2. Other Elective:
   Other "shop"-type workforce development education courses
3. Academic:
   Earth Science
   Biology

SPACE REQUIREMENTS:

1. Square Footage Range: 2,800-3,000 (exclusive of classroom)
2. Peculiar Needs:
   A. Greenhouse (minimum of 1056 square feet)
   B Slathouse (minimum of 1,600 square feet) Typically in proximity to greenhouse.
   C. Security fence around greenhouse and slathouse
   D. Headhouse (minimum of 500 square feet) adjacent to greenhouse
   E. An aquaculture facility is required for Environmental Studies programs
   F. A separate plant identification room is desirable
   G. An agriscience storage and preparation area contiguous to the agriscience laboratory is required
3. Special Conditions:
   A. Covered concrete apron contiguous to shop
   B. Greenhouse located for best possible southern exposure
4. Flexibility Needs:
   Student furniture should be easily moved for frequent rearrangement

FURNISHINGS AND EQUIPMENT:

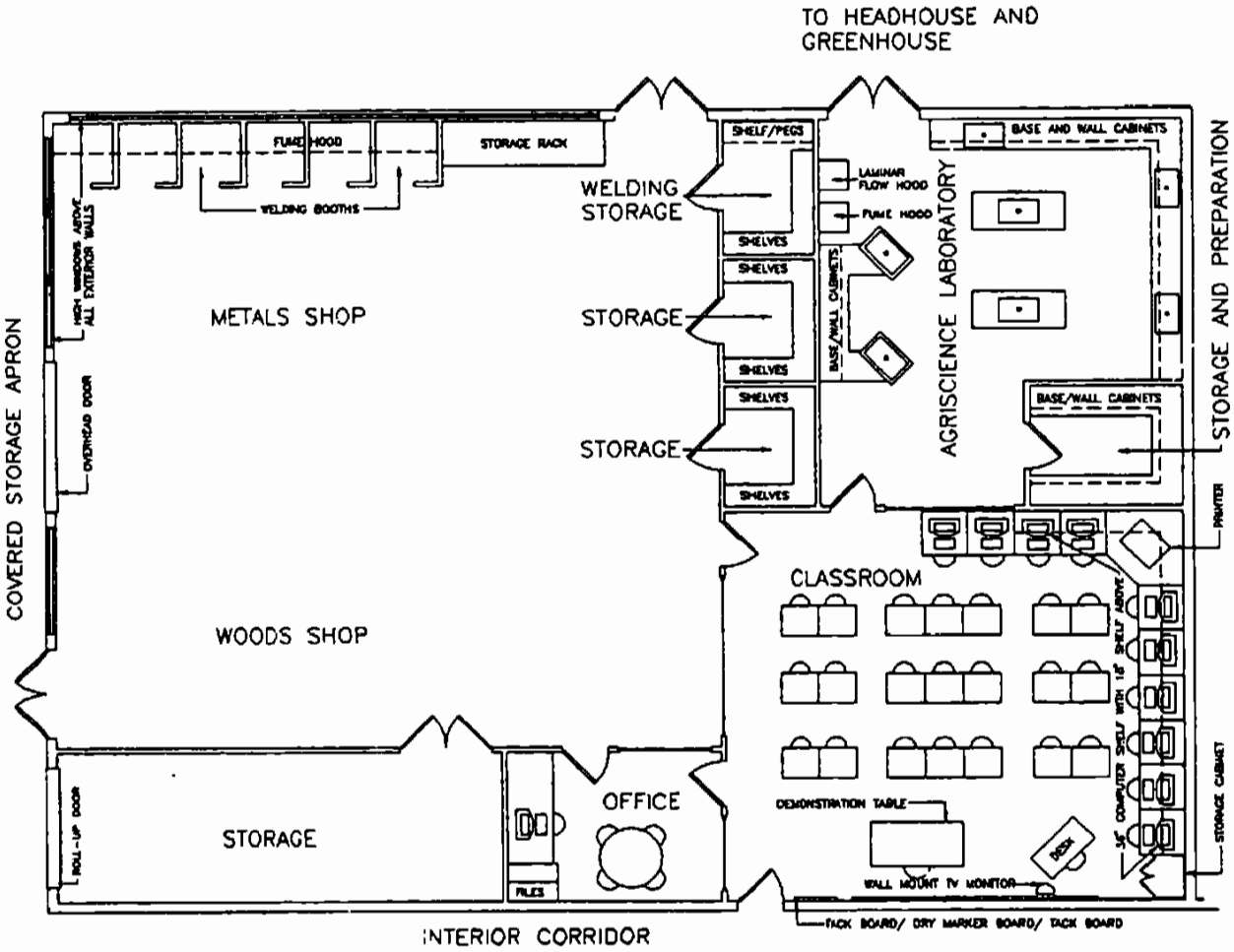
1. Typical Furniture:
   - A. Student tables and chairs, in lieu of desks
   - B. Demonstration table with overhead mirror
   - C. Teacher desk and file cabinets
   - D. 48" conference table with chairs in office area
2. Typical Casework:
   - A. Computer countertop in classroom
   - B. Overhead cabinets--open-faced with adjustable shelves--above computer counter
   - C. "Science"-type base cabinets with deep sinks in agriscience laboratory
   - D. "Science"-type work peninsulas and tables in agriscience laboratory
   - E. Full-height storage cabinet in classroom for instructional materials and media
3. Typical Equipment:
   - A. Aquarium
   - B. Indoor plant growth chamber
   - C. Microscopes and other laboratory equipment
   - D. Hand and power tools
   - E. Heavy-duty machine tools for metal and wood fabrication

SPECIAL NOTES:

1. Deep sink with hot and cold water supply in shop area
2. Emergency eyewash and shower
3. Fume hoods, as required
4. Laminar flow hood
5. Telephone for student and teacher consultation with employers
6. Storage areas for metal, wood, and equipment
7. Ventilation and dust removal systems, as required, in shop areas
8. Access to overhead power source in open shop areas
9. Perimeter electrical receptacles throughout
10. Emergency disconnect switch to all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

Agriscience Applications
Horticulture
Environmental and Natural Resources Studies
Biotechnology and Agriscience Research



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PROGRAM AREA: Agricultural Education

PROGRAM OR COURSE TITLE(S): Animal Science

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To prepare for a career in animal science through an emphasis on basic scientific principles in animal psychology, breeding, and nutrition.
2. Types of Instruction:
   Lecture; demonstration; independent inquiry; small and large-group learning; field trips; shadowing; "hands-on" activities
3. Typical Activities:
   Classroom instruction; conducting business meetings; livestock show demonstrations; livestock care activities, such as hoof trimming and shearing; artificial insemination; embryo transfer and gene splicing
4. Maximum Recommended Class Size: 20
5. Typical Length of Class Period: 90 minutes (block schedule); 55 minutes (traditional)
6. Typical Duration of Course: Semester (block schedule); Year (traditional)

RATIONALE FOR PROGRAM SELECTION:

Provides a basic understanding of the livestock and poultry industries, including safety and management, through emphasis on nutrition, diseases, genetics and breeding, and economics.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Should be located where noise, odors, and student and animal movement will not interfere with other school activities. Proximity to biological sciences is desirable.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   Agricultural Work Development
   Agricultural Production and Management
   Agriscience Applications
2. Other Elective:
   N.A.
3. Academic:
   N.A.

SPACE REQUIREMENTS:

1. Square Footage Range: 2,600 - 3,200 (exclusive of classroom and office areas)
2. Peculiar Needs:
   A. Animal pens will require rail sides and gates which are 60" in height
   B. Wash rack required for animal preparation
   C. Floor drains with traps for straw are required for washing animals and cleaning animal pens

3. Special Conditions:
    A. Poultry should be separated from other livestock
    B. If a swine farrowing or finishing facility is required, the facility should be separated from the main campus and proper waste management provided.
4. Flexibility Needs:
    A. Student furniture should be easily moved for frequent rearrangement
    B. Adequate water supply is required for all livestock and poultry pens and wash rack.

FURNISHINGS AND EQUIPMENT:

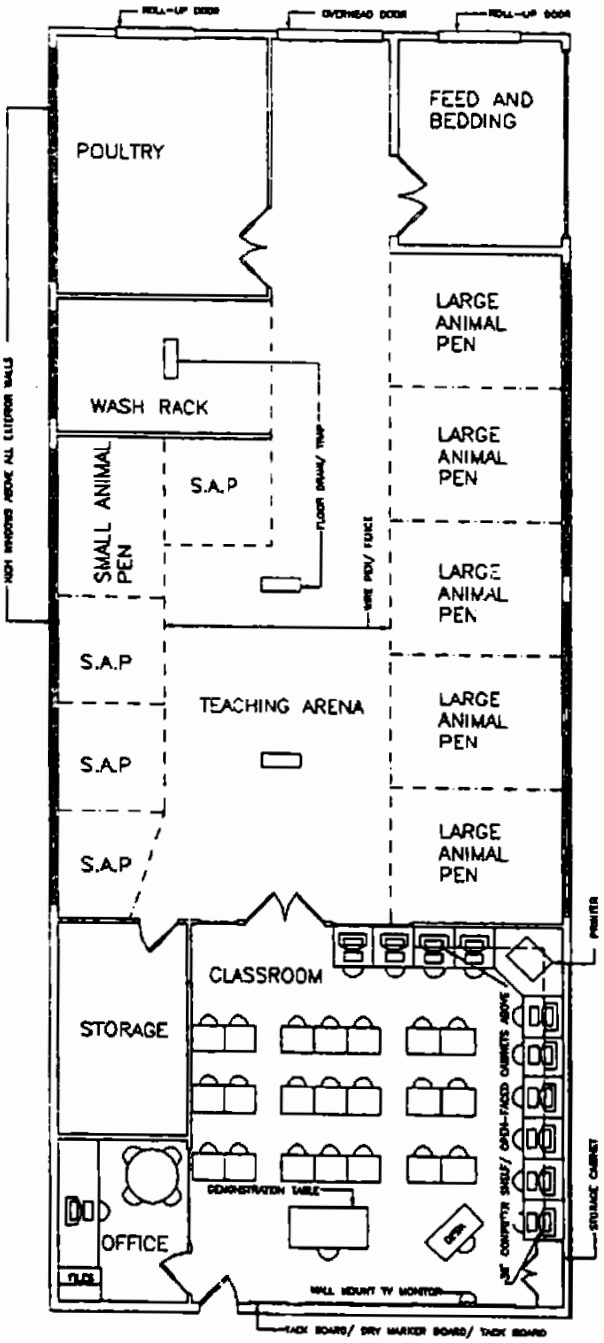
1. Typical Furniture:
    A. Individual student tables with chairs
    B. Teacher file cabinets (minimum of two)
    C. Demonstration table with overhead mirror
    D. Deep sink with hot and cold water for classroom and teaching arena
2. Typical Casework:
    A. Computer counter, as indicated
    B. Open-face overhead cabinets above computer counter
    C. Full-height storage cabinet in classroom
3. Typical Equipment:
    A. Microscopes and other small and large science laboratory paraphernalia
    B. Large cattle scales and other livestock equipment
    C. Telephone for student and teacher consultation with employers
    D. Dry marker and tack boards
    E. Ceiling-mount audiovisual screen

SPECIAL NOTES:

1. Adequate ventilation required for animal health at holding pens and poultry room
2. Non-skid floor finish in arena areas
3. Overhead access to electrical service in open areas of arena
4. Electrical receptacles on perimeter walls in arena area
5. Telephone for student and teacher consultation with employers
6. Emergency disconnect switch to all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

Animal Science



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BUSINESS EDUCATION

PROGRAM AREA: Business Education

PROGRAM OR COURSE TITLE(S): Exploring Business and Marketing **(Middle Grades)**

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To explore the nature of business and marketing in an international economy and to study careers in industry, such as financial services, fashion merchandising, information systems, office systems technology, retail marketing and promotion, and travel and tourism.
2. Types of Instruction:
   Lecture; independent and small-group learning
3. Typical Activities:
   Individual and group research; lectures; peer presentations; computer activities
4. Maximum Recommended Class Size: 18
5. Typical Length of Class Period: 50 minutes
6. Typical Duration of Course: One semester

RATIONALE FOR PROGRAM SELECTION:

Provides opportunities to examine careers and assists in the selection of career pathways related to business and marketing.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Most closely related to other exploratory workforce development education programs, but may be located in any area of the school.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   Exploring Career Decisions
2. Other Elective:
   N.A.
3. Academic:
   English
   Math
   Social Studies

SPACE REQUIREMENTS:

1. Square Footage Range: 1200-1400
2. Peculiar Needs:
   A. Full-height shelves for resource/reference materials
   B. Full-height storage cabinets
   C. Adjustable-height pull-out computer keyboard holders

D. Adjustable-height chairs
E. Internet access

3. Special Conditions:
   N.A.
4. Flexibility Needs:
   N.A.

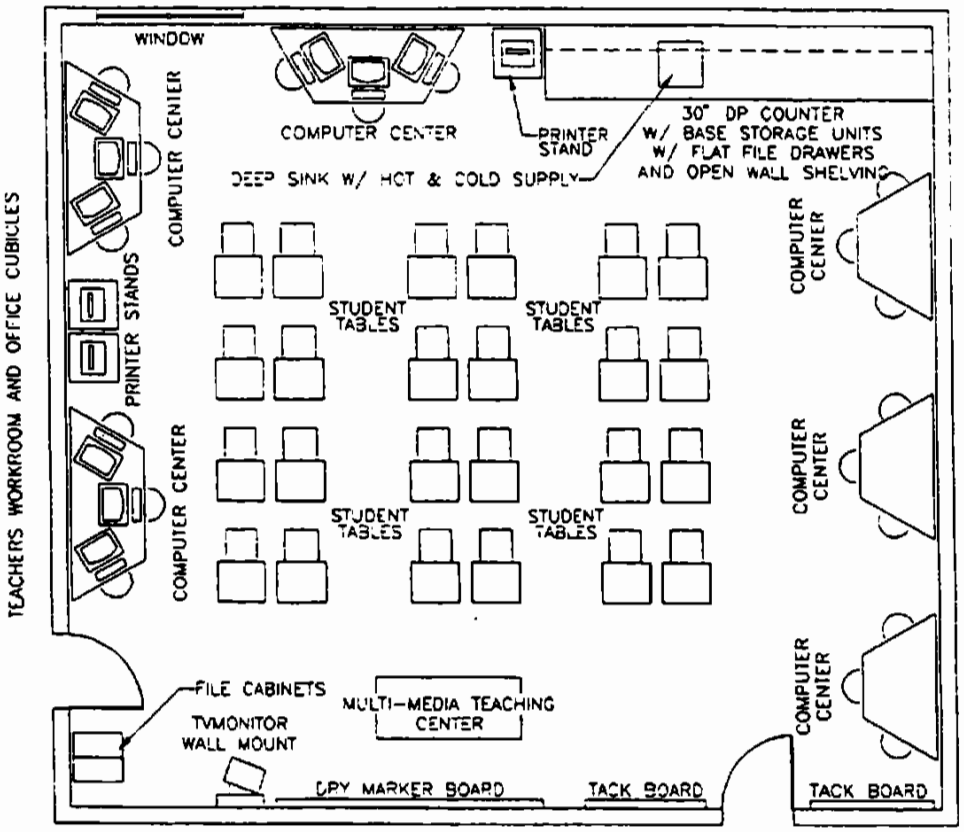
FURNISHINGS AND EQUIPMENT:

1. Typical Furniture:
   A. Individual student tables with adjustable-height chairs
   B. Trapezoidal tables with three (each) adjustable-height chairs
   C. Teacher console, to include work space and multimedia and computer operation
   D. Printer stands (three)
2. Typical Casework:
   A. Built-in storage cabinets
   B. Flat storage area
   C. Sink with hot/cold supply
3. Typical Equipment:
   A. Laser printers
   B. Dry marker board
   C. Overhead-mount AV screen
   D. Computers

SPECIAL NOTES:

1. Much of available wall surface should have tackboard
2. Additional electrical outlets around perimeter at floor level and counter-top level
3. Adjustable shelves in all casework
4. Access to teacher workroom and office space outside classroom.
5. Surge protection for computer circuits

SAMPLE FLOOR PLAN: See next page.


TEACHERS WORKROOM AND OFFICE CUBICLES
WINDOW
COMPUTER CENTER
PRINTER STANDS
COMPUTER CENTER
COMPUTER CENTER
DEEP SINK W/ HOT & COLD SUPPLY
PRINTER STAND
30" DP COUNTER
W/ BASE STORAGE UNITS
W/ FLAT FILE DRAWERS
AND OPEN WALL SHELVING
STUDENT TABLES
STUDENT TABLES
STUDENT TABLES
STUDENT TABLES
COMPUTER CENTER
COMPUTER CENTER
COMPUTER CENTER
FILE CABINETS
TV/MONITOR WALL MOUNT
MULTI-MEDIA TEACHING CENTER
DRY MARKER BOARD
TACK BOARD
TACK BOARD

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EDRS

PROGRAM AREA: Business Education

PROGRAM OR COURSE TITLE(S): Principles of Business
Small Business Entrepreneurship
Business Law
Business and Financial Management

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To develop business skills and techniques and understanding of basic economics and business attitudes.
2. Types of Instruction:
   Lecture/demonstration; independent and small-group cooperative learning activities; technology skills development
3. Typical Activities:
   Small-group cooperative learning; individual and small-group technology activities
4. Maximum Recommended Class Size: 26
5. Typical Length of Class Period: 90 minutes (block schedule); 55 minutes (traditional)
6. Typical Duration of Course: Semester (block schedule); Year (traditional)

RATIONALE FOR PROGRAM SELECTION

Emphasizes integration of the comprehensive business program with appropriate academic concepts and technological skills.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Classroom/labs should be prominently located within the facility, as noise is not a factor. Proximity to marketing education facilities is desirable.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   Marketing Education
2. Other Elective:
   N.A.
3. Academic:
   English
   Math
   Social Studies

SPACE REQUIREMENTS:

1. Square Footage Range: 1600-2000
2. Peculiar Needs:
   A. Lockable storage cabinets for equipment/supplies
   B. Fifteen perimeter computer stations
   C. Telephone lines and modem for networking

3. Special Conditions:
   A. Networked computers (local school)
   B. Internet access for all computers
4. Flexibility Needs:
   N.A.

FURNISHINGS AND EQUIPMENT:

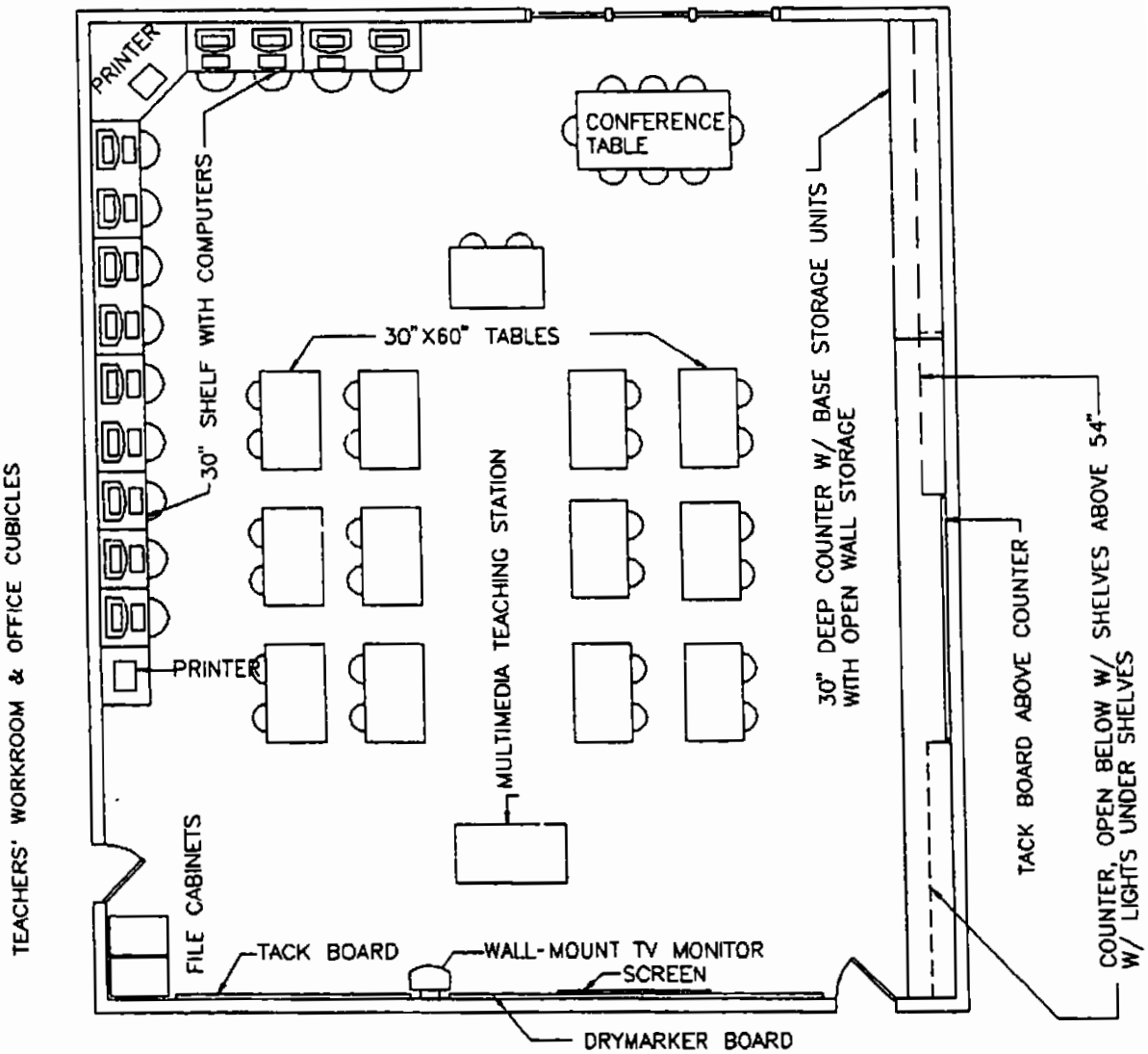
1. Typical Furniture:
   A. Thirteen computer stations with adequate work space and adjustable-posture rolling chairs.
   B. Thirteen two-student tables with two (each) adjustable-posture rolling chairs
   C. One eight-foot conference table
   D. Two standard filing cabinets with locks
   E. Two printer stands
   F. Multi-media teacher workstation
2. Typical Casework:
   A. Base cabinets with lockable doors
   B. Adjustable-height shelves above base cabinets
3. Typical Equipment:
   A. Overhead-mount A.V. screen
   B. LCD panel or projection device with remote control
   C. Color scanners
   D. FAX machine
   E. Multimedia computers
   F. Laser printers

SPECIAL NOTES:

1. Much of available wall surface should have tackboards or strips.
2. Perimeter duplex outlets at counter-top height
3. Adjustable shelves in all casework
4. Access to teacher workroom and office space outside classroom
5. Glare-free lighting
6. Surge protection for computer outlets and power boards
7. Static-free carpet

SAMPLE FLOOR PLAN: See next page.

Principles of Business; Small Business Entrepreneurship;
Business Law; Business and Financial Management



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PROGRAM AREA: Business Education

PROGRAM OR COURSE TITLE(S):
Keyboarding (**Middle grades**)
Business Computer Technology (**Middle grades**)
Computer Applications
Business and Electronic Communications
Computerized Accounting
Network Administration
Business Management and Applications

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To develop occupational and entrepreneurial skills for initial employment and advancement in an international economy.
2. Types of Instruction:
   Demonstration; small-group cooperative learning; independent projects
3. Typical Activities:
   Independent computerized simulations
4. Maximum Recommended Class Size: 26
5. Typical Length of Class Period: 50 minutes (middle grades); 90 minutes (block schedule); 55 minutes (traditional)
6. Typical Duration of Course: Semester (middle grades); Semester (block schedule); Year (traditional)

RATIONALE FOR PROGRAM SELECTION:

Prepares for careers or advanced training in the occupational clusters of Office Systems Technology, Accounting and Finance, Business Management and Ownership, Information Systems, and Business Administration.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Classroom/labs should be prominently located within the facility, as noise is not a factor. Proximity to marketing education facilities is desirable.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   N.A.
2. Other Elective:
   N.A.
3. Academic:
   English
   Math
   Social Studies

SPACE REQUIREMENTS:

1. Square Footage Range: 2000-2500
2. Peculiar Needs:
   A. Full-height shelves
   B. Lockable cabinets for equipment/supplies storage
   C. Sink with hot and cold supply
   D. Telephone lines for network
   E. Multi-media teacher workstation which permits teacher monitoring of student workstations and electronic communication with individual students.
3. Special Conditions:
   A. Internet access for all computer stations
   B. Networked computer stations (local school)
4. Flexibility Needs:
   N.A.

FURNISHINGS AND EQUIPMENT:

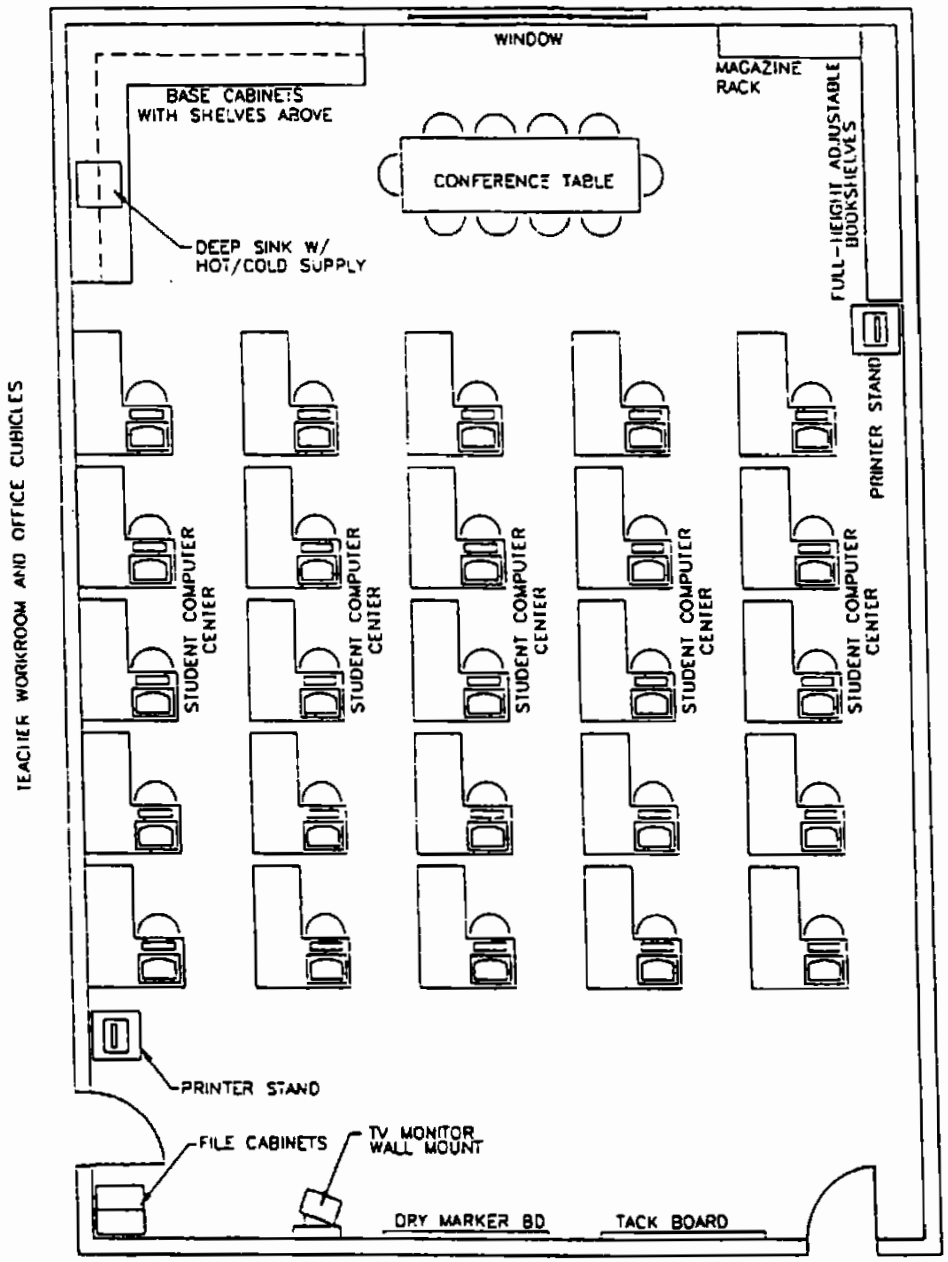
1. Typical Furniture:
   A. Twenty-five L-shaped computer tables with adjustable-posture rolling chairs
   B. Conference table (capacity: 10)
   C. Built-in projection panel connected to multi-media teacher workstation (VCR included)
2. Typical Casework:
   A. Base cabinet with doors
   B. Full-height adjustable bookshelves
   C. Two standard size file cabinets (lockable)
3. Typical Equipment:
   A. Tackboards and strips; Dry marker boards
   B Ceiling-mount A.V. screen
   C. Color scanners
   D. Laser printer and stand
   E. FAX machine
   F. Computers with CD-ROM

SPECIAL NOTES:

1. Recessed floor receptacles for student workstations in center of room. Outlets at counter-top height around perimeter of room
2. Adjustable shelves in all casework
3. Access to teacher workroom and office space outside classroom/lab
4. Glare-free lighting
5. Surge protection for computers and power boards
6. HVAC to maintain required room temperature
7. Static-free carpet
8. Telephone lines for internal modems at all workstations

SAMPLE FLOOR PLAN: See next page.

Keyboarding (Middle Grades); Business Computer Technology (Middle Grades); Computer Applications; Business and Electronic Communications; Computerized Accounting; Network Administration; Business Management and Applications



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CAREER DEVELOPMENT

PROGRAM OR COURSE TITLE(S): Exploring Career Decisions (**Middle Grades**)

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To provide exploratory experiences which develop decision-making ability and result in a tentative career development plan for each student.
2. Types of Instruction:
   Lecture/demonstration; small-group cooperative learning; independent inquiry
3. Typical Activities:
   Small-group simulations/exploratory activities conducted at six to eight relocatable centers by groups of two to four students each
4. Maximum Recommended Class Size: 18
5. Typical Length of Class Period: 50 minutes
6. Typical Duration of Class: One semester

RATIONALE FOR PROGRAM SELECTION:

Exploring Career Decisions is a career guidance/development program which is appropriate for all middle graders and which can support the State Board of Education-adopted National Career Development Guidelines and educational planning guidelines.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Exploring Career Decisions is closely related to all other exploratory workforce development education programs and to other guidance functions within the school, and may appropriately be located within proximity to any of the above. While it is activity oriented, it is not a noisy or dirty program in the traditional "shop" sense and may be located in any given area of the building.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   Exploring Biotechnology
   Exploring Business and Marketing
   Exploring Life Skills
   Exploring Technology Systems
2. Other Elective:
   Art
   Guidance (Classroom)
3. Academic:
   N.A.

SPACE REQUIREMENTS:

1. Square Footage Range: 1,300-1,600

2. Peculiar Needs:
    A. Greenhouse window
    B. Perimeter computer stations (minimum of six)
    C. Full-height shelves for career information materials and books
    D. Full-height reach-in cabinets (with doors) for student project storage
    E. Storage room with washer/dryer and full-height perimeter shelving
3. Special Conditions:
    Work bench area may require acoustical treatment.
4. Flexibility Needs:
    Student furniture should be easily moved for frequent rearrangement.

FURNISHINGS AND EQUIPMENT:

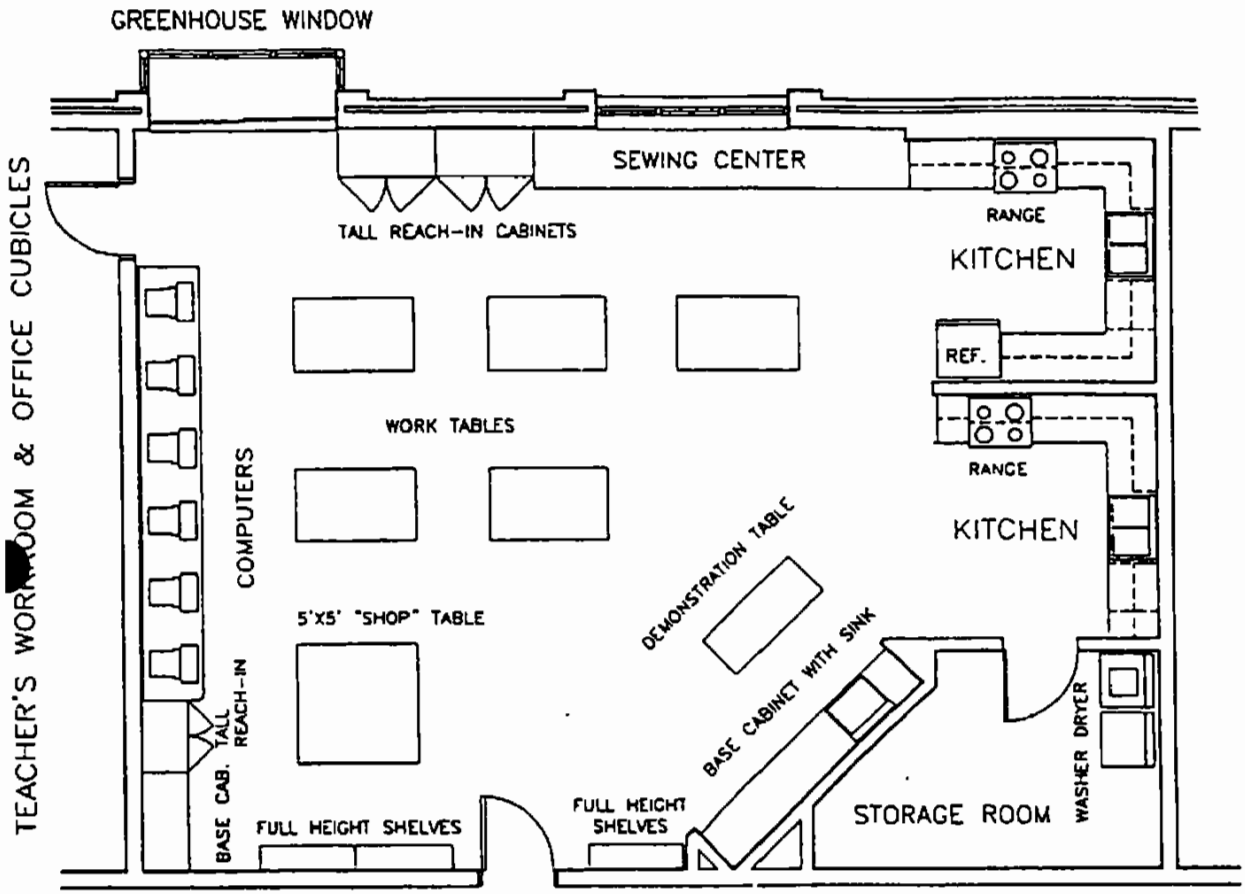
1. Typical Furniture:
    A. Tables and chairs (in lieu of student desks)
    B. Heavy-duty four-station work bench (one) with laminated wood top
    C. Demonstration table with overhead mirror
    D. Teacher desk and file cabinets (minimum of two)
2. Typical Casework:
    A. Base cabinets wherever possible around perimeter
    B. Horizontal and vertical storage units for large sheet materials
    C. Built-in sewing center (minimum of three stations)
    D. Student "kitchens" (two)
    E. Deep sink with hot/cold water supply in classroom (minimum of one)
3. Typical Equipment:
    A. Small hand and portable power tools
    B. Consumer kitchen tools, utensils, and portable appliances
    C. Tackboards; dry marker boards; pull-down A.V. screen
    D. See: Vocational & Technical Education Equipment Standards

SPECIAL NOTES:

1. Much of available wall surface should have tackboards for program materials and student work.
2. Additional electrical receptacles around perimeter walls above base units
3. Some direct access to electricity in open floor spaces
4. Adjustable shelves in all casework
5. Separate teacher workroom and office space outside of classroom
6. Emergency disconnect switch to all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

EDRS



A design adopted from Conway Middle schoo
Skinner, Lamm, Hood & Highsmith, Architects

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FAMILY AND CONSUMER SCIENCES EDUCATION

PROGRAM AREA: Family and Consumer Sciences Education

PROGRAM OR COURSE TITLE(S): Exploring Life Skills **(Middle Grades)**

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To explore life management skills essential to the work of the family, which include resource management, nutrition and wellness, personal and social responsibility, fashion and appearance, and career development.
2. Types of Instruction:
   Lecture; demonstration; independent and small-group study; various lab activities
3. Typical Activities:
   Hands-on individual and group activities of a self-directed, exploratory nature which require multi-media technology and learning centers/labs
4. Maximum Recommended Class Size: 18
5. Typical Length of Class Period: 55 minutes
6. Typical Duration of Course: Semester

RATIONALE FOR PROGRAM SELECTION:

Applied life management skills appropriate to the middle school years are explored, with a focus on developing positive self-concept. Skills in applying basic academics, problem solving, decision making, and creative and critical thinking are reinforced.

PROGRAM LOCATIONS AND RELATIONSHIPS:

May be located in proximity to other exploratory workforce development education programs, the media center, or the student services area, and should have direct ground-level exterior access.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   Exploring Career Decisions
2. Other Elective:
   N.A.
3. Academic:
   N.A.

SPACE REQUIREMENTS:

1. Square Footage Range: 1,400-1,600
2. Peculiar Needs:
   A. Kitchen lab (per 3-5 students) with sink, range, and storage
   B. 240V. service for range and dryer
   C. Ventilation for range and dryer

3. Special Conditions:
   A. Free-standing demonstration table with sink, range, and dishwasher
   B. Locking storage for foods and student tote trays
   C. Access to separate teacher office and storage
   D. Barrier-free student work station(s)
   E. Ceiling-mounted demonstration mirror (optional)
   F. Tile floor in food prep areas; carpet in other areas
4. Flexibility Needs:
   A. Sewing and multi-purpose tables
   B. Food carts

FURNISHINGS AND EQUIPMENT:

1. Typical Furniture:
   Student tables with stackable chairs for simple rearrangement
2. Typical Casework:
   A. Kitchen cabinets
   B. Countertops for computers and student project work
   C. Cabinets for hide-away sewing machines
   D. Shelving and storage cabinets for student projects
3. Typical Equipment:
   A. Computers (networked) (4)
   B. Printers (2)
   C. Sewing machines (one per four students)
   D. Sergers (2)
   E. Dishwasher
   F. Washer and dryer
   G. Refrigerator/freezer with ice maker
   H. Range and microwave (per student lab)
   I. Teacher work station with networked computer and telephone
   J. Wall-mounted T.V. monitor
   K. Dry marker board and tack boards

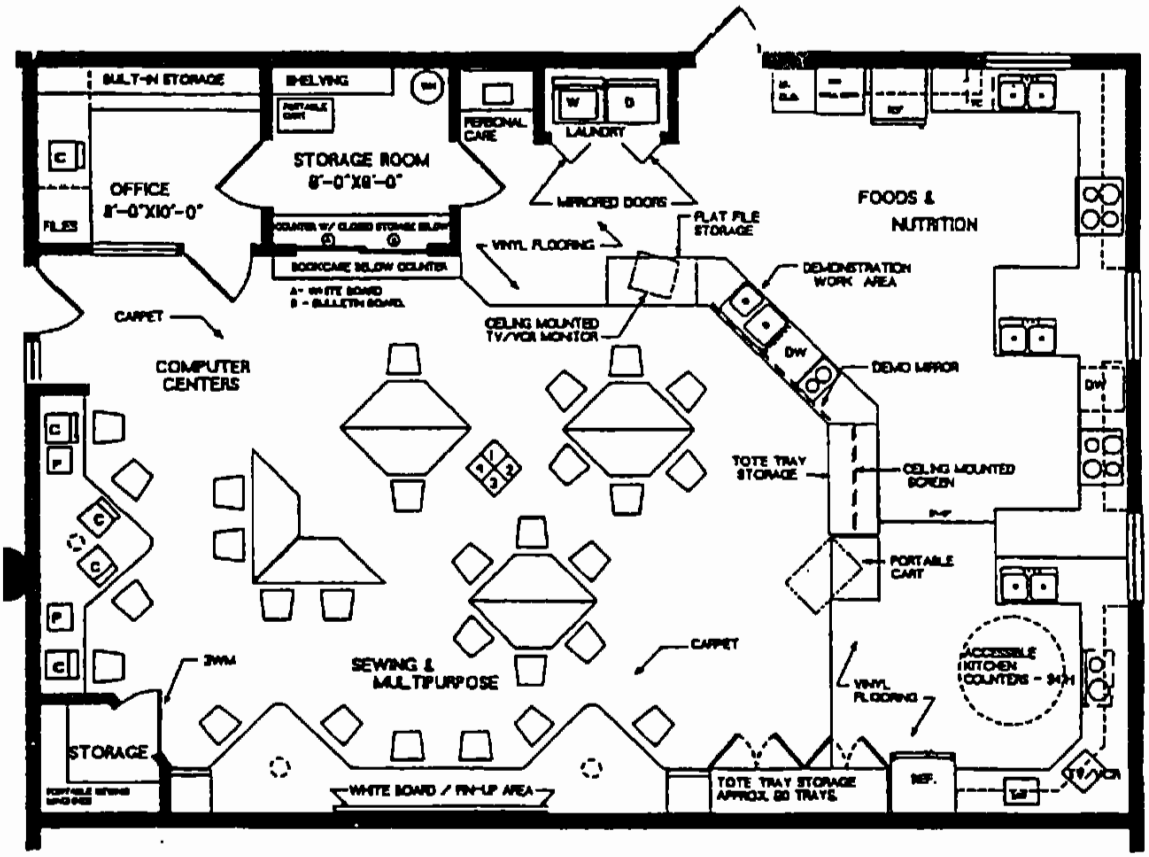
SPECIAL NOTES:

Emergency disconnect switch to all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

EDRS

Exploring Life Skills



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PROGRAM AREA: Family and Consumer Sciences Education: Comprehensive High School

PROGRAM OR COURSE TITLE(S): Teen Living
Life Management
Clothing Design
Foods and Nutrition
Interior Design and Housing
Parenting and Child Development

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To provide for advancement in and application of knowledge and skills related to the work of the family and in identified careers related to the core areas of: consumer education and resource management; family and interpersonal relationships; foods and nutrition sciences; interiors, housing and design; human development and parenting education; and textiles, apparel and fashion.
2. Types of Instruction:
   Lecture; demonstration; independent and small-group study and lab activities
3. Typical Activities:
   Self-directed individual and group hands-on activities utilizing multi-media technology in learning centers/labs.
4. Maximum Recommended Class Sizes:
   Teen Living; Life Management; Parenting and Child Development: 26
   Foods and Nutrition; Interior Design and Housing: 20
   Clothing Design: 16
5. Typical Length of Class Period: 90 minutes (block schedule); 55 minutes (traditional)
6. Typical Duration of Course: Semester (block schedule); Year (traditional)

RATIONALE FOR PROGRAM SELECTION:

Applied life management skills appropriate to the high school years are examined, with a focus on those essential to the work of the family and to success in the workplace. Skills in the application of basic academics, problem solving, decision making, and creative and critical thinking are reinforced.

PROGRAM LOCATIONS AND RELATIONSHIPS:

May be located in proximity to any classroom areas which promote a central focus within the school, and should have direct exterior access.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   Early Childhood Education
   Apparel Design Services
   Interior Design Services
2. Other Elective:
   N.A.

3. Academic:
   N.A.

SPACE REQUIREMENTS:

1. Square Footage Range: 1,400-1,600 (Additional 125-200 for office/storage)
2. Peculiar Needs:
   A. Ventilation for range and dryer
   B. 240V. service for range and dryer
   C. Kitchen lab (per 3-5 students) with sink, range, and storage
3. Special Conditions:
   A. Free-standing demonstration table with range, sink, and dishwasher
   B. Locking storage for foods and student tote trays
   C. Access to separate teacher office and storage
   D. Barrier-free student work stations
   E. Tile floors in food prep areas; carpet in other areas
   F. Ceiling-mounted demonstration mirror
4. Flexibility Needs:
   A. Sewing and multi-purpose tables
   B. Food carts

FURNISHINGS AND EQUIPMENT:

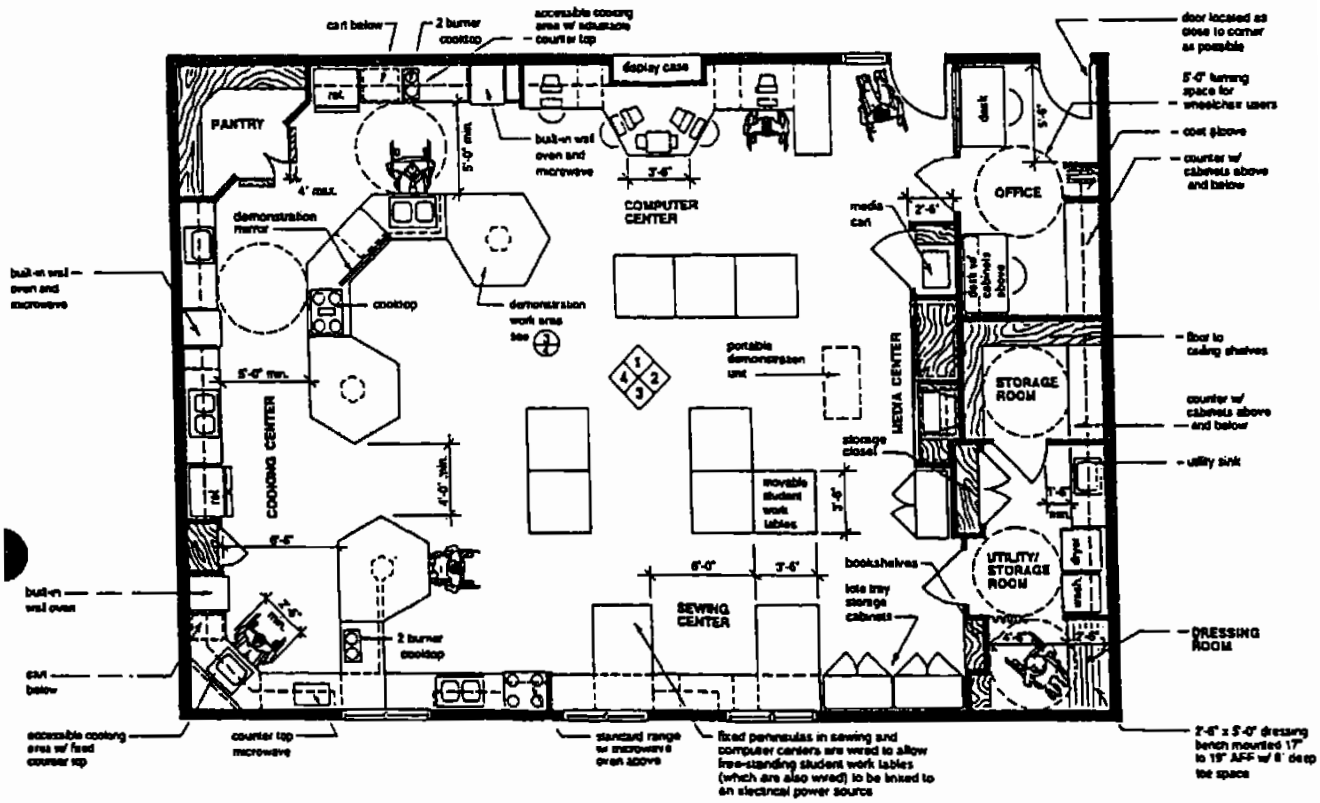
1. Typical Furniture:
   Student tables with stackable chairs for simple rearrangement
2. Typical Casework:
   A. Kitchen Cabinets
   B. Countertops for computers and student project work
   C. Cabinets for hide-away sewing machines
   D. Shelving and storage cabinets for student projects
3. Typical Equipment:
   A. Computers (networked) (4)
   B. Printers (2)
   C. Sewing machines (one per four students)
   D. Sergers (2)
   E. Dishwasher
   F. Washer and dryer
   G. Refrigerator/freezer with ice maker
   H. Range and microwave (per student lab)
   I. Teacher work station with networked computer and telephone
   J. Wall-mounted T.V. monitor
   K. Dry marker board and tack boards

SPECIAL NOTES:

Emergency disconnect switch to all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

Family and Consumer Sciences Education
Comprehensive High School



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PROGRAM AREA: Family and Consumer Sciences Education

PROGRAM OR COURSE TITLE(S): Clothing Design
Apparel Design Services
Interior Design and Housing
Interior Design Services

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To provide theory and hands-on work experience which develop skills in the apparel and interior design services industries.
2. Types of Instruction:
   Lecture; demonstration; group cooperative learning; independent practice
3. Typical Activities:
   Group activities and demonstrations utilizing independent practice, design, production and interpretations, construction, and portfolio development
4. Maximum Recommended Class Size:
   Interior Design and Housing; Interior Design Services: 20
   Clothing Design: 16
5. Typical Length of Class Period:
   Clothing Design; Interior Design: 90 minutes (block schedule); 55 minutes (traditional)
   Apparel Design Services ; Interior Design Services: 90 minutes (block schedule); 110 minutes (traditional)
6. Typical Duration of Course:
   Clothing Design; Interior Design: Semester (block schedule); Year (traditional)
   Apparel Design Services; Interior Design Services: Year (block or traditional)

RATIONALE FOR PROGRAM SELECTION:

Prepares for immediate employment through instruction and hands-on experiences in related job, job-seeking, management, and leadership skills. Portfolios for scholarship, college entrance, and job seeking purposes are developed.

PROGRAM LOCATIONS AND RELATIONSHIPS:

May be located in proximity to any other instructional area, preferably in a high-visibility and high-traffic area. Should be directly accessible to the ground level.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   N.A.
2. Other Elective:
   Drafting I
   Commercial Art

3. Academic:
   N.A.

SPACE REQUIREMENTS:

1. Square Footage Range: Classroom: 2,000 - 2,300
   Office; storage; refinishing: 420
2. Peculiar Needs:
   A. Computer-aided design center
   B. Cutting/teaching/demonstration center
   C. Production center
   D. Sewing center
   E. Separate storage area
3. Special Conditions:
   A. Adequate ventilation for furniture finishing, serger, and clothes dryer
   B. Hard-surface floor
4. Flexibility Needs:
   A. Tables and machines are movable to facilitate frequent rearrangement
   B. Office and locked storage accessible from corridor and classroom
   C. Chemical resistant counter tops, as indicated

FURNISHINGS AND EQUIPMENT:

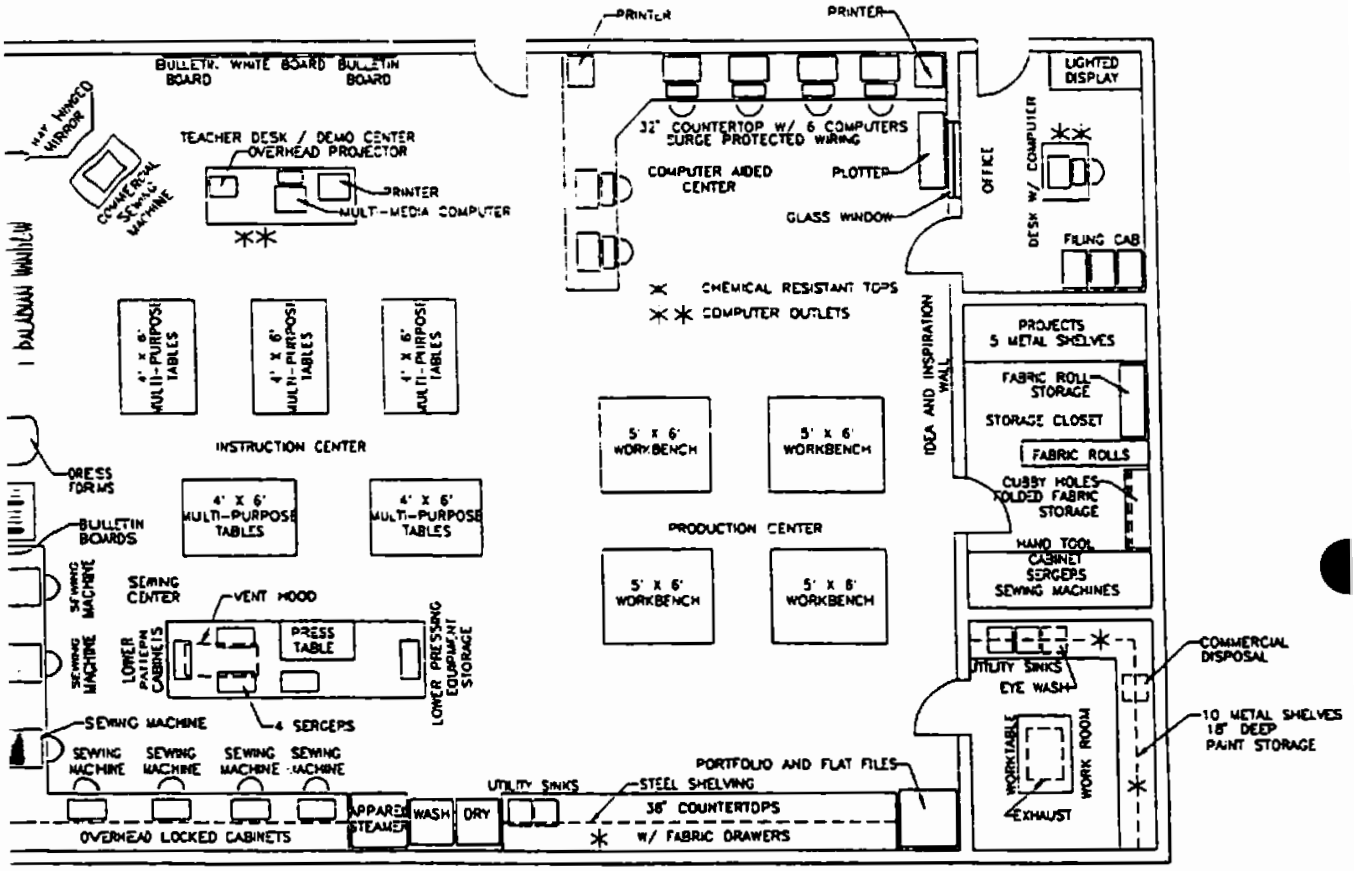
1. Typical Furniture:
   A. 4'x6' tables with chairs
   B. Work bench with power and storage beneath
   C. Heavy-duty steel shelving
   D. File cabinets: standard and vertical
   E. Three-way mirror
   F. Multi-media teacher station
2. Typical Casework:
   A. 32" computer counter and plotter shelf
   B. 36" high base cabinets for utility sinks over closed-door storage in refinishing room
   C. 36" counter top in sewing area, with alternating knee space and tote tray storage, and storage cabinets with adjustable shelving above
   D. 36" high serger island with four duplex receptacles and enclosed storage beneath
3. Typical Equipment:
   A. Sewing machines--domestic and commercial; sergers
   B. Small hand tools
   C. Pressing equipment--commercial: table; boards, irons
   D. Washer/dryer
   E. Apparel steamer
   F. Dress form
   G. Fabric roll rack

SPECIAL NOTES:

1. Wash basin with eyewash
2. Commercial disposal
3. Explosion-proof wiring in refinishing room
4. Receptacles @ 3'0" o.c. on all walls
5. Lighted display
6. Idea/inspiration walls: sheetrock, with mock circuit boxes, residential door and window frames, and electrical switches and receptacles, for painting and wallpapering practice
7. Large dry marker board in teacher demonstration center, flanked by tackboards
8. 18" deep adjustable steel shelves over cabinets in refinishing room
9. 36" deep steel shelving in project storage
10. Emergency disconnect switch to all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

Clothing Design; Apparel Design Services
Interior Design and Housing; Interior Design Services



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PROGRAM AREA: Family and Consumer Sciences Education

PROGRAM OR COURSE TITLE(S): Culinary Arts and Hospitality

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To develop required knowledge and skills in food preparation techniques, service, management, and entrepreneurship for entry into culinary arts and hospitality occupations.
2. Types of Instruction:
   Lecture; demonstration, small-group work; lab activities within a simulated restaurant/catering facility.
3. Typical Activities:
   Preparation and serving of food to "customers" in various lab stations
4. Maximum Recommended Class Size: 16
5. Typical Length of Class Period: 90 minutes (block schedule); 110 minutes (traditional)
6. Typical Duration of Course: Year (block schedule or traditional)

RATIONALE FOR PROGRAM SELECTION:

Provides preparation for employment or further education in one of the nation's largest and fastest-growing industries.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Should be located separate from but in proximity to the school cafeteria, with outside entry for deliveries and loading of catered food. Office, with phone for accepting catering orders and placing supply orders.

SHARED SPACE OPTIONS:

1. State and local codes and commercial equipment inventory preclude sharing of spaces.

SPACE REQUIREMENTS:

1. Square Footage Range: 2,000-2,400
2. Peculiar Needs:
   A. Computer station with network access
   B. Office with phone
   C. Student lockers
   D. Secure storage area
3. Special Conditions:
   A. Exhaust system as required
   B. Fire control pull station per codes
4. Flexibility Needs:
   Wheels on tables and other equipment for easy rearrangement of work stations

FURNISHINGS AND EQUIPMENT:

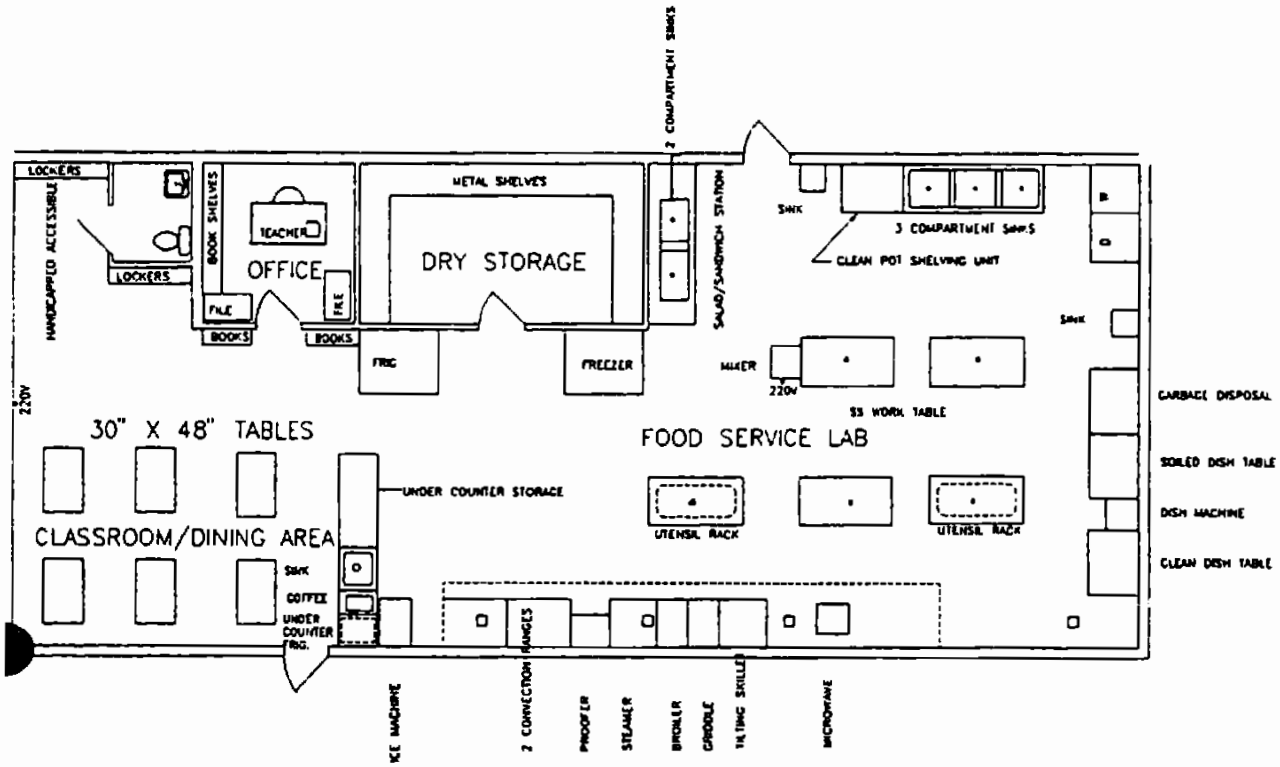
1. Typical Furniture:
   - A. Rectangular tables in classroom/dining area
   - B. Commercial food preparation equipment
2. Typical Casework:
   - A. Counter-top peninsula (beverage center)
   - B. State and local codes for shelving, storage, etc.
3. Typical Equipment:
   - Commercial food equipment

SPECIAL NOTES:

1. Office wired for multi-media computer
2. Electrical outlets per code beneath kitchen work tables
3. 240 V. outlets in classroom/dining area for buffet bar
4. Floor drain(s) for steamer and tilting skillet
5. Ceramic tile on kitchen floor
6. Vinyl tile in classroom/dining area
7. All equipment to be NSF approved
8. Electrical receptacles where possible on perimeter walls
9. Emergency disconnect switch to all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

Culinary Arts and Hospitality



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PROGRAM AREA: Family and Consumer Sciences Education

PROGRAM OR COURSE TITLE(S): Parenting and Child Development
Early Childhood Education

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To explore roles and responsibilities of parenting and to develop skills for careers in working with young children.
2. Types of Instruction:
   Lecture; demonstration; independent inquiry; cooperative learning
3. Typical Activities:
   Individual and group hands-on projects and demonstrations; small-group exploratory activities and simulations
4. Maximum Recommended Class Size:
   Parenting and Child Development: 26
   Early Childhood Education: 16
5. Typical Length of Class Period:
   Parenting and Child Development: 90 minutes (block schedule)
   55 minutes (traditional)
   Early Childhood Education: 90 minutes (block schedule)
   110 minutes (traditional)
6. Typical Duration of Course:
   Parenting and Child Development: Semester (block schedule); Year (traditional)
   Early Childhood Education: Year: (block schedule or traditional)

RATIONALE FOR PROGRAM SELECTION:

Provides application of basic child development theory as preparation for family and career. Involves care and education of children birth through age eight and the enhancement of family wellness.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Classroom and contiguous child care center should be in an area away from normal student traffic and near a parking lot for unloading and loading of clients. Should be in proximity to cafeteria if food services are used.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   N.A.
2. Other Elective:
   Psychology
3. Academic:
   N.A.

SPACE REQUIREMENTS:

1. Square Footage Range: 1,400-1,600 (classroom)
   25/child (client) minimum (child care center)
2. Peculiar Needs:
   A. Classroom
      1) Observation window (one-way) with sound monitor to observe adjacent child care center and outside play area
      2) Access to teacher office space for student conferences and employer contacts
      3) Storage for teacher and for student materials
      4) Hand-wash station with hot and cold supply
   B. Child care center
      The layout should include low shelves, child-size furniture, clearly-defined areas and clear pathways, child-size fixtures in toilets, and low windows to provide visibility for children.
3. Special Conditions:
   A. Classroom
      1) Lockable storage areas in classroom and storage room
      2) Computers for student use
      3) Shuttered observation windows
      4) Handicapped accessible
   B. Child care center
      Must meet North Carolina Child Day Care Section, Statutory Authority GS 110.
4. Flexibility Needs:
   A. Classroom
      1) Two-student tables and chairs for frequent rearrangement
   B. Child care center
      1) Furnishings should be portable to permit rotation of center arrangement.
      2) Allow space for beds, cots, or mats for rest time and provide storage space for them when not in use.

FURNISHINGS AND EQUIPMENT:

1. Typical Furniture:
   A. Classroom
      1) Two-student tables with chairs
      2) High-low table for lecture/demonstration using computer or overhead projector
   B. Child care center (all child-size)
      1) Tables and chairs
      2) Bookcases
      3) Upholstered or soft chairs for reading
      4) Storage units

2. Typical Casework:
   A. Classroom
      1) Base cabinet (30" deep) with overhead cabinets
      2) Ledge under observation windows for note taking
      3) Computer counter
      4) Wardrobe cabinet; flat storage cabinet in storage room
   B. Child care center
      Overhead cabinets in food preparation area
3. Typical Equipment:
   A. Classroom
      1) Tack boards; dry marker board
      2) Ceiling-mount AV screen; wall-mount T.V. monitors
   B. Child care center
      1) Computer; T.V./VCR
      2) Equipment for centers, to include block, housekeeping, cooking, listening, art, music, science, woodworking, sand/water, and reading (see North Carolina Child Day Care Standards)

SPECIAL NOTES:

1. Classroom
   A. Carpet on floor
   B. Adjustable shelves in all casework
   C. Pull-out shelves in base cabinets
   D. Computer and telephone in teacher office area
   E. Electrical receptacles where possible on perimeter walls
   F. Emergency disconnect switch to all equipment and outlets except lights
2. Child care center
   A. Floor covering tile or carpet, as indicated
   B. Emergency disconnect switch to all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

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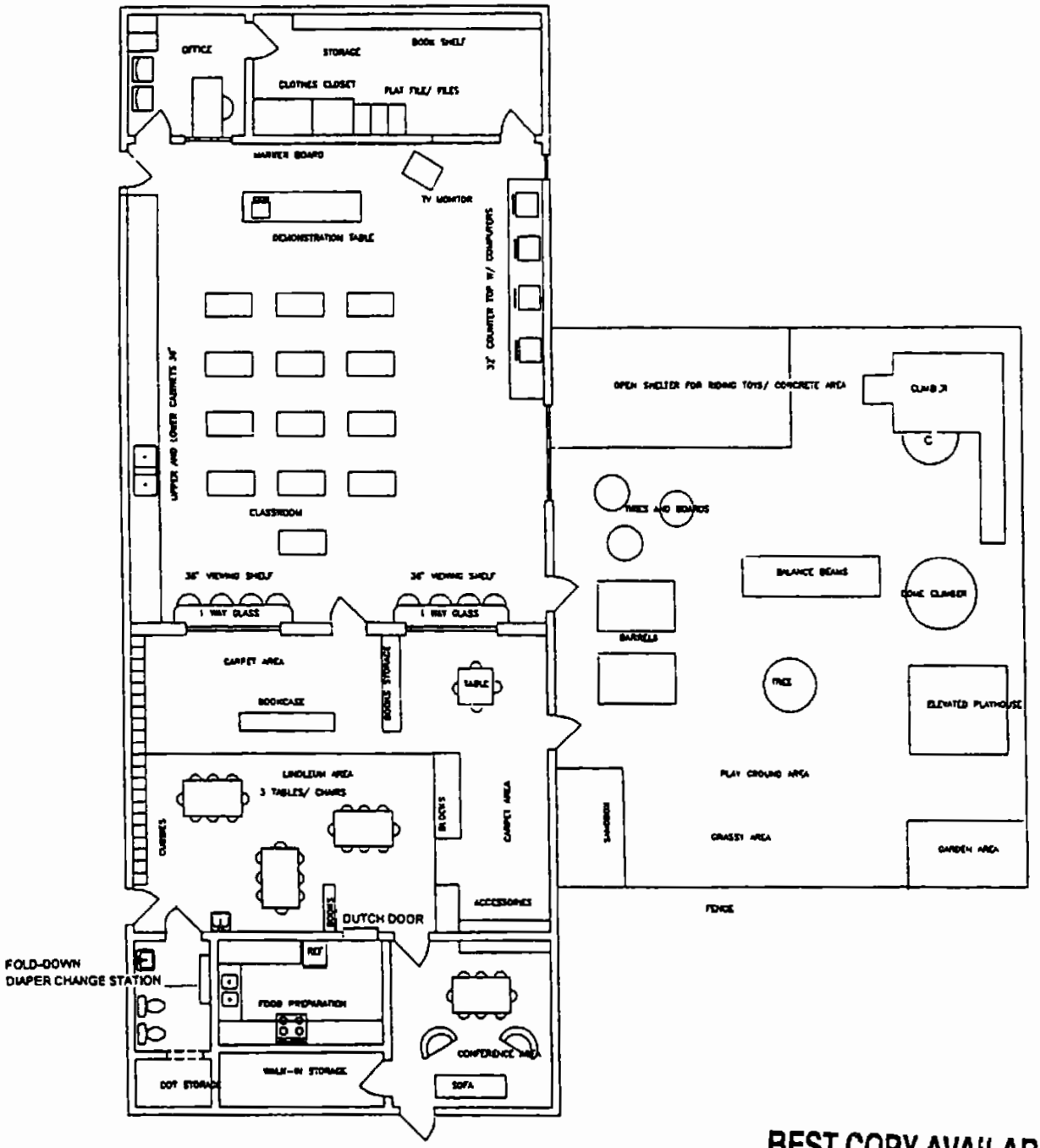

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PROGRAM AREA: Family and Consumer Sciences Education

PROGRAM OR COURSE TITLE(S): Food Science

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To develop basic knowledge and entry-level skills for applied science careers related to dietetics, nutrition, and the foods industry. Laboratory skills in the scientific evaluation of foods, food preservation, and related product development are emphasized.
2. Types of Instruction:
   Demonstration; cooperative learning; experimental research; multi-media presentations; lecture
3. Typical Activities:
   Team scientific experimentation; group research and analysis by up to four students each at six work stations
4. Maximum Recommended Class Size: 20
5. Typical Length of Class Period: 90 minutes (block schedule); 55 minutes (traditional)
6. Typical Duration of Course: Semester (block Schedule); Year (traditional)

RATIONALE FOR PROGRAM SELECTION:

An applied science which integrates the scientific method, math, technical communication, nutrition, and foods with laboratory skills needed for foods-related careers. Skills are developed in problem solving, decision making, and teamwork, and 60% or more of class time is devoted to hands-on scientific experimentation with food products.

PROGRAM LOCATIONS AND RELATIONSHIPS:

May share space with the science department and with the food preparation area of family and consumer sciences programs. Easy access to ground-level delivery is desirable.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   Family and Consumer Sciences programs which have food preparation areas
2. Other Elective:
   Principles of Technology
3. Academic:
   Physical and Environmental Sciences
   Microbiology
   Physics

SPACE REQUIREMENTS:

1. Square Footage Range: 2,000-2,500
2. Peculiar Needs:
   A. VCT floors for food sanitation requirements and work with chemicals
   B. Chemical-resistant countertops

C. One computer with Internet connection per lab station
D. Six vented lab stations with two-burner stove/hot plate and double sink
E. Locking storage for chemicals
F. Eye-wash station (dual-purpose faucet)
G. Two 120V. duplex outlets per lab station

3. Special Conditions:
   A. Glass partition between assembly area and lab areas
   B. Demonstration table with hot/cold supply at sink, hot plate, and 120V. outlet
   C. Access to secured office area for conferencing and communication with work-based learning sites
4. Flexibility Needs:
   A. Portable computer stations
   B. 48" square student tables with four chairs each

FURNISHINGS AND EQUIPMENT:

1. Typical Furniture:
   A. Portable computer stations
   B. Student cubicles at counter height
   C. L-shaped teacher work centers
   D. Square student tables with four chairs each
   E. Individual student tables with chair in lieu of student desks
   F. Teacher desk with chair
2. Typical Casework:
   A. Kitchen/lab stations
   B. Teacher demonstration center
   C. Distribution center
   D. Base cabinets for dishwasher, hand-wash, and eye-wash
   E. Closet for lab coats
   F. Full-height storage cabinet for microscopes, balances, and buret stands
   G. Full-height food pantry
3. Typical Equipment:
   A. Washing machine and dryer
   B. Built-in dishwasher
   C. Commercial convection oven
   D. U.V. cabinet for sanitizing safety glasses
   E. Metal chemical storage cabinet
   F. Disposal
   G. Refrigerator/freezer

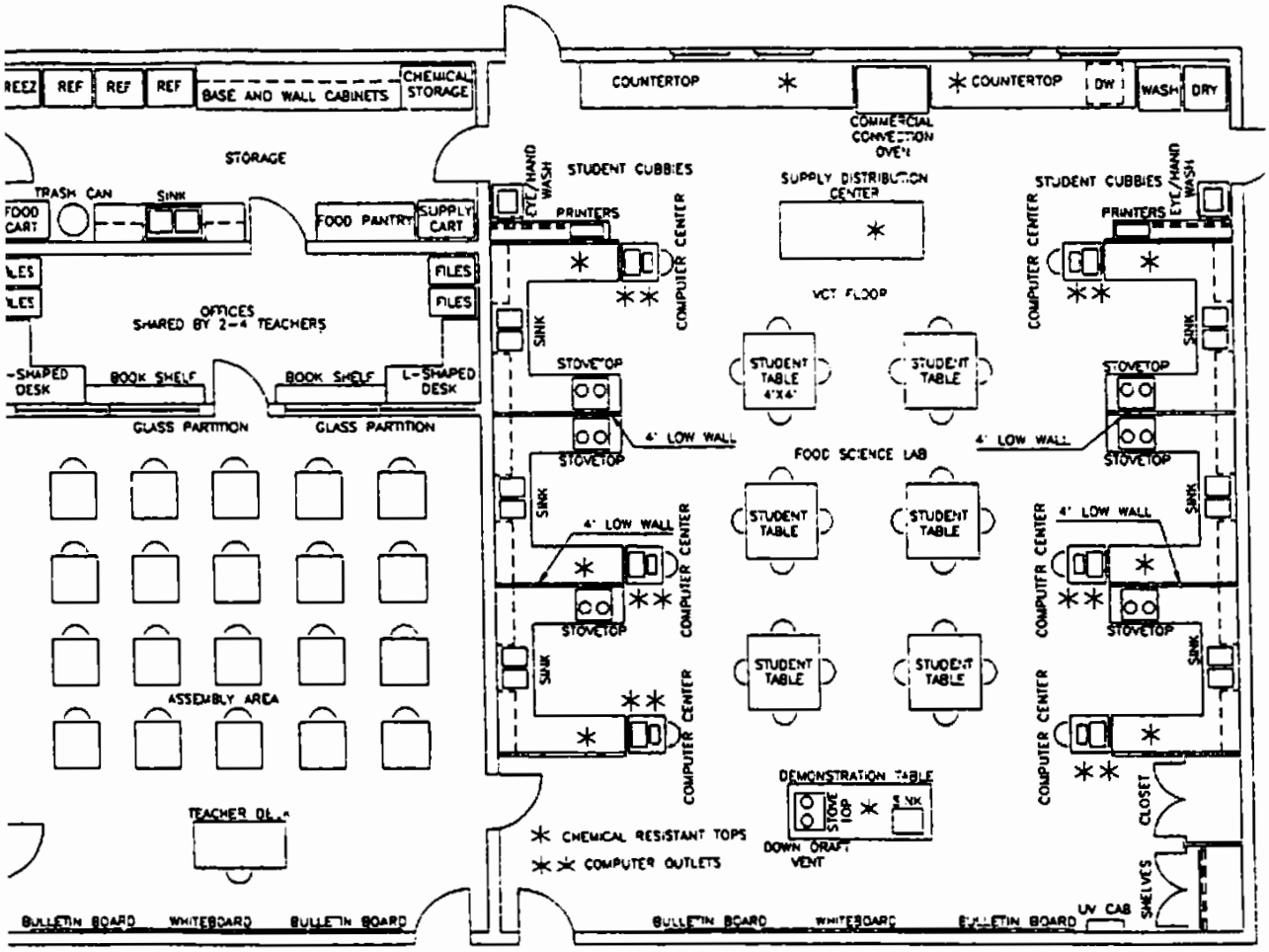
SPECIAL NOTES:

1. Computers networked to printers
2. Translator to connect computer/CD ROM stations to classroom TV monitor
3. Exterior entrance to facilitate deliveries
4. Controlled temperature chemical storage area

5. Meet OSHA regulations for chemical storage and use and for food handling and preparation
6. Emergency disconnect switch to all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

Food Science



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HEALTH OCCUPATIONS EDUCATION

PROGRAM AREA: Health Occupations Education

PROGRAM OR COURSE TITLE(S): Biomedical Technology
Health Team Relations
Allied Health Sciences I/II
Medical Sciences I/II

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To provide didactic and applied learning experiences related to the preparation of a health care worker.
2. Types of Instruction:
   Lecture/demonstration; small-group cooperative learning; role play/simulation; independent inquiry
3. Typical Activities:
   Teacher demonstrations and small-group simulations and role play conducted at multiple relocatable centers by two to four students each
4. Maximum Recommended Class Size: 26
5. Typical Length of Class Period: 90 minutes (block schedule); 55 minutes (traditional)
6. Typical Duration of Course: Semester (block schedule); Year (traditional)

RATIONALE FOR PROGRAM SELECTION:

A pre-technical/pre-professional foundations program appropriate for all students in grades 9-12 which supports National Health Care Skill Standards.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Based on natural and social sciences and the humanities, it is appropriately placed within or in proximity to the science department. It is not a noisy program.

SHARED SPACE OPTIONS:

N.A.

SPACE REQUIREMENTS:

1. Square Footage Range: 2,400-2,600
2. Peculiar Needs:
   A. Lab arrangement representative of National Health Care Skills Standards, e.g. diagnostic services, therapeutic services, informational services, and environmental services. Relocatable divider walls between areas
   B. Computer stations with Internet access in informational services areas
   C. Full-height adjustable shelves in storage area

D. Over-counter shelves and counter with shelves, drawers, and seating openings below in diagnostic services area. Electrical outlets along partition wall(s) at counter height
E. Full stove, refrigerator, and washer/dryer in dietetics area
F. Hot and cold water supply to all service areas
G. Electrical outlets along perimeter walls at standard base height and at counter height where counters are indicated
H. Student dressing room with lockers

3. Special Conditions:
   N.A.
4. Flexibility Needs:
   Student furniture should be easily moved for frequent rearrangement.

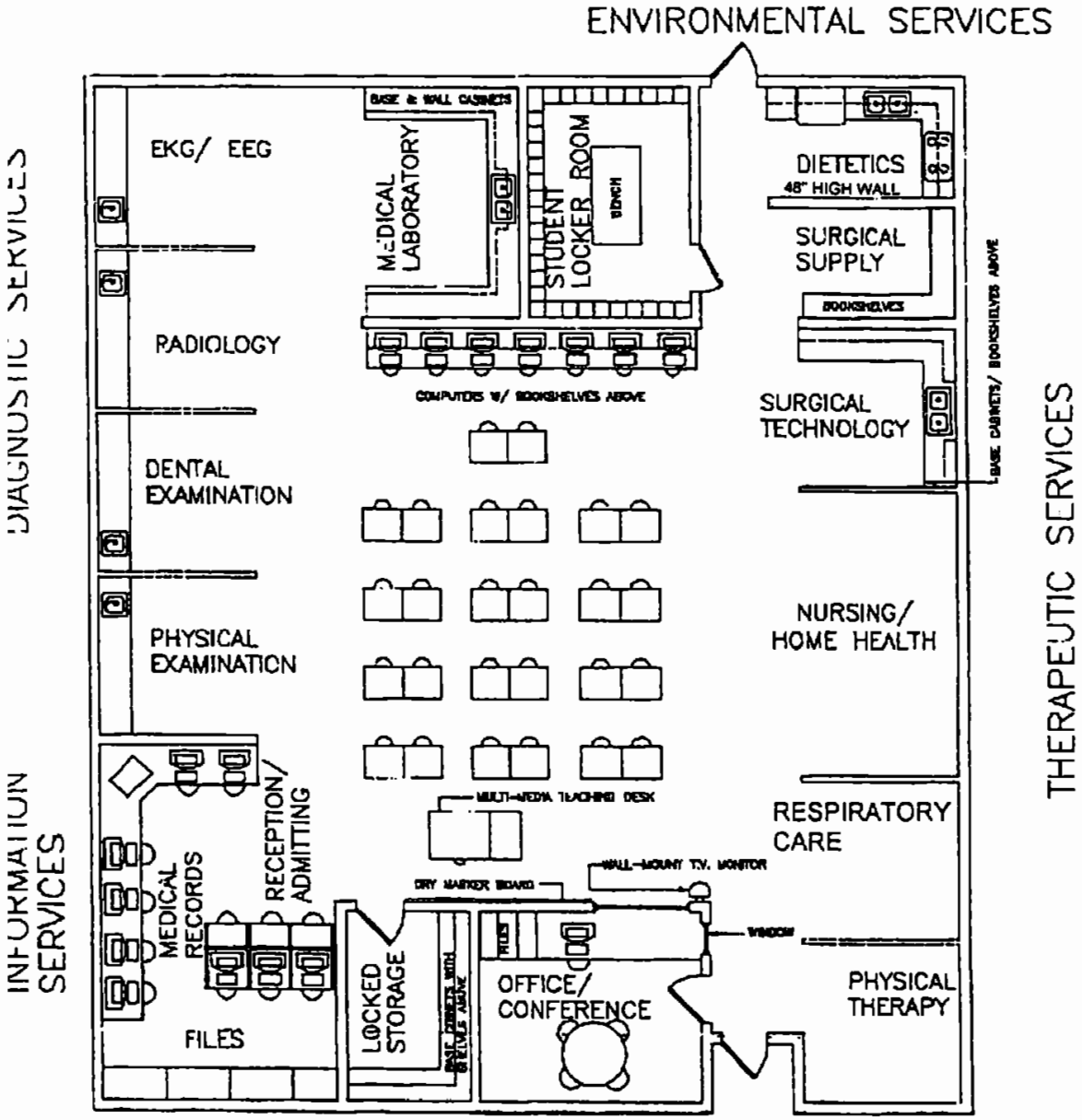
FURNISHINGS AND EQUIPMENT:

1. Typical Furniture:
   A. Student tables and chairs (in lieu of desks)
   B. Variety of stationary and portable stools, chairs, stretchers, beds, over-bed tables, examining tables, wheelchairs, rehabilitation bars, etc.
   C. Computerized multimedia instructor desk with connection to TV and VCR
   D. Book shelving and locked storage shelving in lab
2. Typical Casework:
   A. Base cabinets, where indicated, with lockable and adjustable shelving above and below
   B. Two deep surgical sinks with knee controls and three counter-top or stand-alone standard sinks with hot and cold water supply
3. Typical Equipment:
   A. Hospital/health agency-type equipment
   B. Dry marker boards
   C. Ceiling-mount AV screen
   D. Anatomical charts attached to walls or portable stands
   E. Pegboard in therapeutic services area for hanging equipment, such as crutches, walkers, and canes

SPECIAL NOTES:

1. Access to separate teacher workroom and office space with telephone and computer
2. Adjustable shelving in all casework; all casework to be lockable
3. Much of available wall surface should have tackboards or strips
4. Ample space needed in center of lab for demonstration and practice
5. Emergency disconnect switch to all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.



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MARKETING EDUCATION

PROGRAM AREA: Marketing Education

PROGRAM OR COURSE TITLE(S):
Principles of Business
Marketing
Fashion Merchandising
Business and Financial Management
Travel, Tourism, and Recreation Marketing
Small Business Entrepreneurship
Marketing Management
Marketing Technology and Media
Strategic Marketing
Marketing Career Studies

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To prepare for initial employment and advancement in marketing and management careers and/or further training at the post-secondary level.
2. Types of Instruction:
   Lecture/demonstration; computer/Internet research; small-group cooperative learning; work-based activities; such as cooperative education, internships, and youth apprenticeships.
3. Typical Activities:
   Classroom instruction; individual and small-group projects and presentations; lab experiences; computer simulations; teacher and student demonstrations; visual displays; computer/Internet research; media layout
4. Maximum Recommended Class Size: 21
5. Typical Length of Class Period: 90 minutes (block schedule); 55 minutes (traditional)
6. Typical Duration of Course: Semester (block schedule); Year (traditional)

RATIONALE FOR PROGRAM SELECTION:

Provides skills essential to success in the workplace or entry into further training in a marketing career, with emphasis on marketing functions and foundations and economic and human resource foundations. Based upon the National Curriculum Framework and National Skill Standards.

PROGRAM LOCATIONS AND RELATIONSHIPS:

May be located at any point within the school. Proximity to business education labs is desirable. Where a student store is a part of the marketing laboratory, consideration should be given to a location which provides convenient access to the total student body.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   Business Education
2. Other Elective:
   Art
   Graphics
3. Academic:
   English
   Math
   Social Studies

SPACE REQUIREMENTS:

1. Square Footage Range: 1500-2000 (including store)
2. Peculiar Needs:
   A. All computers networked (local school) and with Internet access
   B. Indirect, glare-free ceiling lighting
   C. Display window (four feet deep by eight feet wide) fronting hallway. Should have three duplex electrical outlets and should be lockable.
   D. Office windows should provide visual access to classroom
   E. High-mount TV monitor on teaching wall
   F. Ceiling-mount AV screen at teaching wall
   G. Office, storage room, and store should be lockable
   H. Walls between conference room and classroom should be glass above 42"
   I. Store-front glass in store on corridor
3. Special Conditions:
   A. Recessed floor receptacle boxes at student tables
   B. Perimeter duplex outlets at counter height
4. Flexibility Needs:
   Student furniture should be easily moved for frequent rearrangement.

FURNISHINGS AND EQUIPMENT:

1. Typical Furniture:
   A. Five four-student tables with chairs
   B. Two (minimum) lockable file cabinets
   C. Round, four-station conference table with chairs in teacher office
   D. Eight-foot conference table with eight chairs
   E. Multi-media teacher station in classroom
   F. Dry marker board and tack board on teaching wall
   G. Adjustable-height rolling chairs at computer stations
2. Typical Casework:
   A. Computer counters with overhead cabinets above
   B. Base cabinet with deep sink (hot/cold water supply recommended)
   C. Adjustable bookshelves in conference area
   D. Full-height, lockable storage cabinet in storage room
   E. Flat paper storage and 15" wide project storage shelves in storage room

F. Base cabinets (lockable) with adjustable wall shelving in store
G. Cash register counter in store

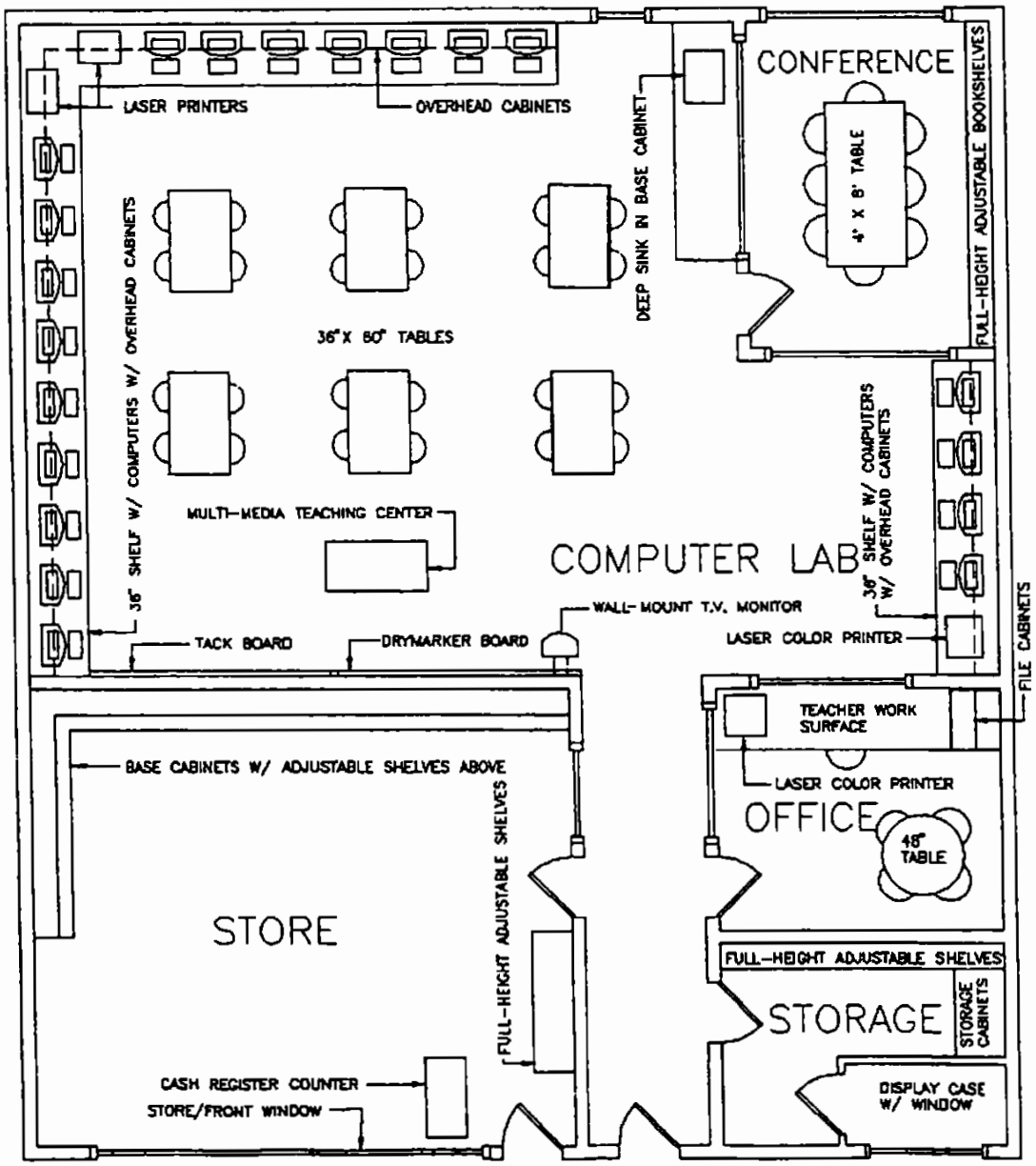
3. Typical Equipment:
   A. Computers
   B. Printers

SPECIAL NOTES:

1. Some marketing education programs include the operation of a student store. Depending upon the inventory of products to be vended, up to 500 additional square feet may be required for the inclusion of a store.
2. Adjustable shelves in all casework
3. Access to teacher workroom outside classroom/lab
4. Master switch for all receptacles serving equipment
5. Surge protection for all computers and power boards
6. HVAC to maintain required room temperature
7. Static-free carpet
8. Telephone lines for internal modems at all computer stations
9. Color printer to be located in teacher office and networked to student computer stations
10. Furniture quantity based on anticipated enrollment
11. Electrical receptacles where possible on perimeter walls

SAMPLE FLOOR PLAN: See next page.

EDRS



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TECHNOLOGY EDUCATION

PROGRAM AREA: Technology Education

PROGRAM OR COURSE TITLE(S): Exploring Technology Systems **(Middle Grades)**

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To explore basic technological systems and related career fields.
2. Types of Instruction:
   Lecture/demonstration; independent inquiry; small-group cooperative learning; laboratory-based experiences
3. Typical Activities:
   Exploratory activities which include technical drawing, graphic design, model and prototype development, computer applications, electronics, and audiovisuals production
4. Maximum Recommended Class Size: 18
5. Typical Length of Class Period: 55 minutes
6. Typical Duration of Course: Semester

RATIONALE FOR PROGRAM SELECTION:

Develops adaptability, through the integration of mathematics, science, communications, research, and technology, to ensure success as consumers, citizens, and productive members of the workforce.

PROGRAM LOCATIONS AND RELATIONSHIPS:

May be appropriately located in any area of the school, as noise is not a factor.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   Any other exploratory course in which there is integration of activities
2. Other Elective:
   Any elective course in which there is integration of activities
3. Academic:
   Any academic course in which there is integration of activities

SPACE REQUIREMENTS:

1. Square Footage Range: 1,400-2,000
2. Peculiar Needs:
   Two distinct instructional areas--planning/design/lecture and materials processing--separated by a glass partition with a direct-access door
3. Special Conditions:
   N.A.

4. Flexibility Needs:
   N.A.

FURNISHINGS AND EQUIPMENT:

1. Typical Furniture:
   A. Drafting/design tables and chairs in lieu of student desks
   B. Demonstration table
   C. Heavy-duty work tables and benches
   D. Teacher desk and file cabinets
2. Typical Casework:
   A. Base cabinets on perimeter walls
   B. Horizontal and vertical storage units
   C. Deep sink with hot and cold supply
3. Typical Equipment:
   Floor and bench-mounted power tools

SPECIAL NOTES:

Emergency disconnect switch to all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

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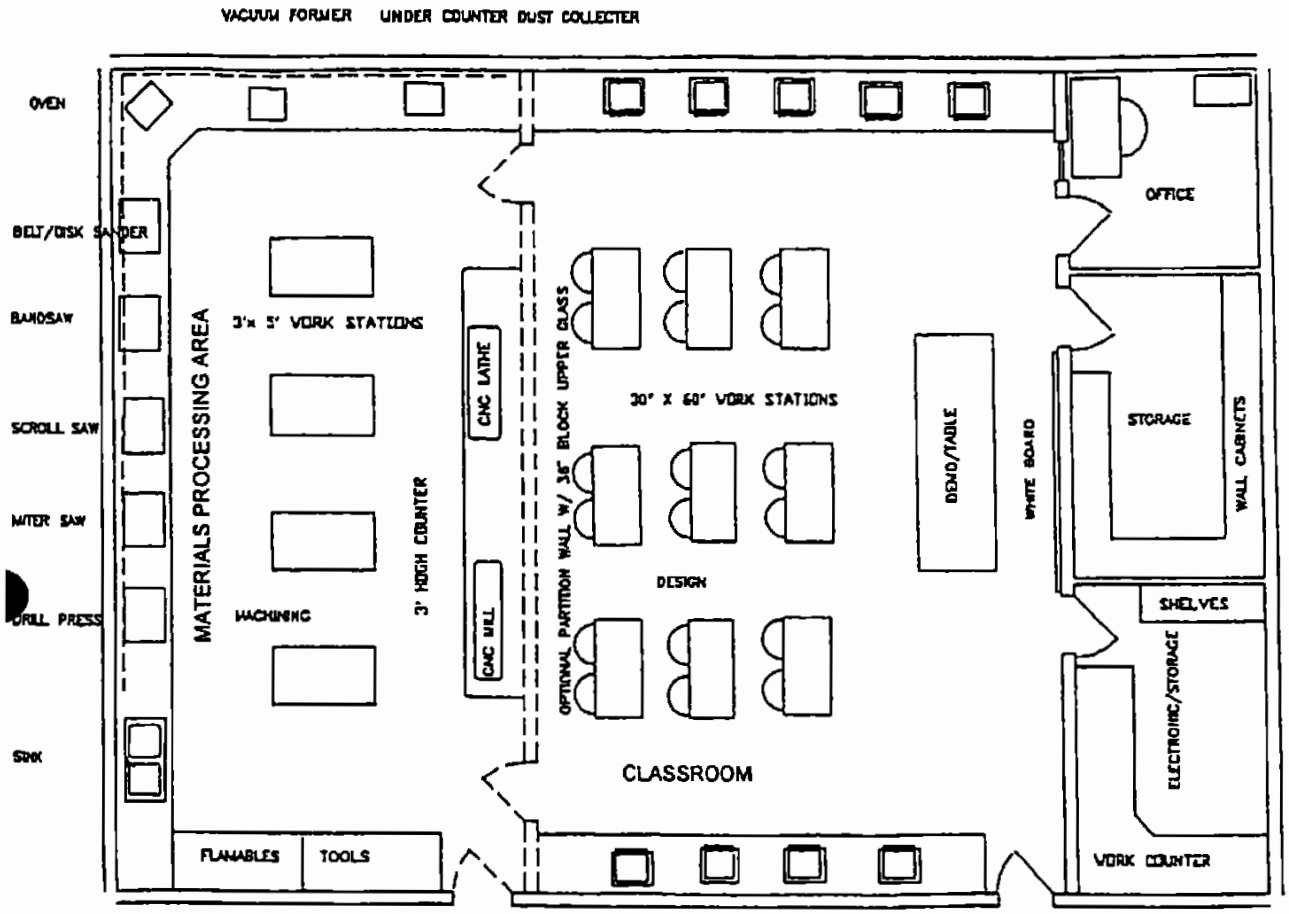
Exploring Technology Systems



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PROGRAM AREA: Technology Education

PROGRAM OR COURSE TITLE(S): Fundamentals of Technology

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To understand the tools, techniques, and processes of technology using a systems approach.
2. Types of Instruction:
   Lecture/demonstration; independent inquiry; small-group cooperative learning; laboratory-based experiences
3. Typical Activities:
   Problem definition, research, solution development, and prototype construction utilizing appropriate tools, materials, and processes. Use of computers in the design process, activity simulations, computer numeric control, and testing and evaluation.
4. Maximum Recommended Class Size: 20
5. Typical Length of Class Period: 90 minutes (block schedule); 55 minutes (traditional)
6. Typical Duration of Course: Semester (block schedule); Year (traditional)

RATIONALE FOR PROGRAM SELECTION:

Fosters a level of adaptability which ensures success as consumers, citizens, and members of the workforce through the integration of mathematics, science, communications, research, and technology.

PROGRAM LOCATIONS AND RELATIONSHIPS:

May be appropriately be placed in any location within the school, as noise is not a problem.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   A. Any other program in which there is integration of activities
   B. Technology Education (See Special Notes section)
      1) Communication Systems
      2) Manufacturing Systems
      3) Structural Systems
      4) Transportation Systems
      5) Technology Studies
2. Other Elective:
   May be shared with any programs in which there is integration of activities.
3. Academic:
   May be shared with any programs in which there is integration of activities.

SPACE REQUIREMENTS:

1. Square Footage Range: 1,800-2,200

2. Peculiar Needs:
   A. Two distinct instructional areas--planning/design/lecture and material processing
   B. Glass partition with a direct-access door between instructional areas
3. Special Conditions:
   N.A.
4. Flexibility Needs:
   N.A.

FURNISHINGS AND EQUIPMENT:

1. Typical Furniture:
   A. Two-student tables with chairs in lieu of student desks
   B. Demonstration table
   C. Heavy-duty work stations
   D. Teacher desk and file cabinets
2. Typical Casework:
   A. Base cabinets on perimeter walls
   B. Horizontal and vertical storage cabinets
   C. Deep sink with hot and cold supply
3. Typical Equipment:
   A. Portable, bench-top power tools
   B. Assorted hand tools
   C. Computer numeric control machines (bench-top)
   D. Computers

SPECIAL NOTES:

1. For schools with more than one technology education facility, specific laboratories may be required for Communication Systems, Manufacturing Systems, Structural Systems, or Transportation Systems. Such course-specific facilities will require modification of the Fundamentals of Technology sample plan.

2. Communication Systems requires a production area suitable for audiovisual production, to include filming, audio recording, and audiovisual mixing. This production area will replace the materials processing area shown on the Fundamentals of Technology sample plan.

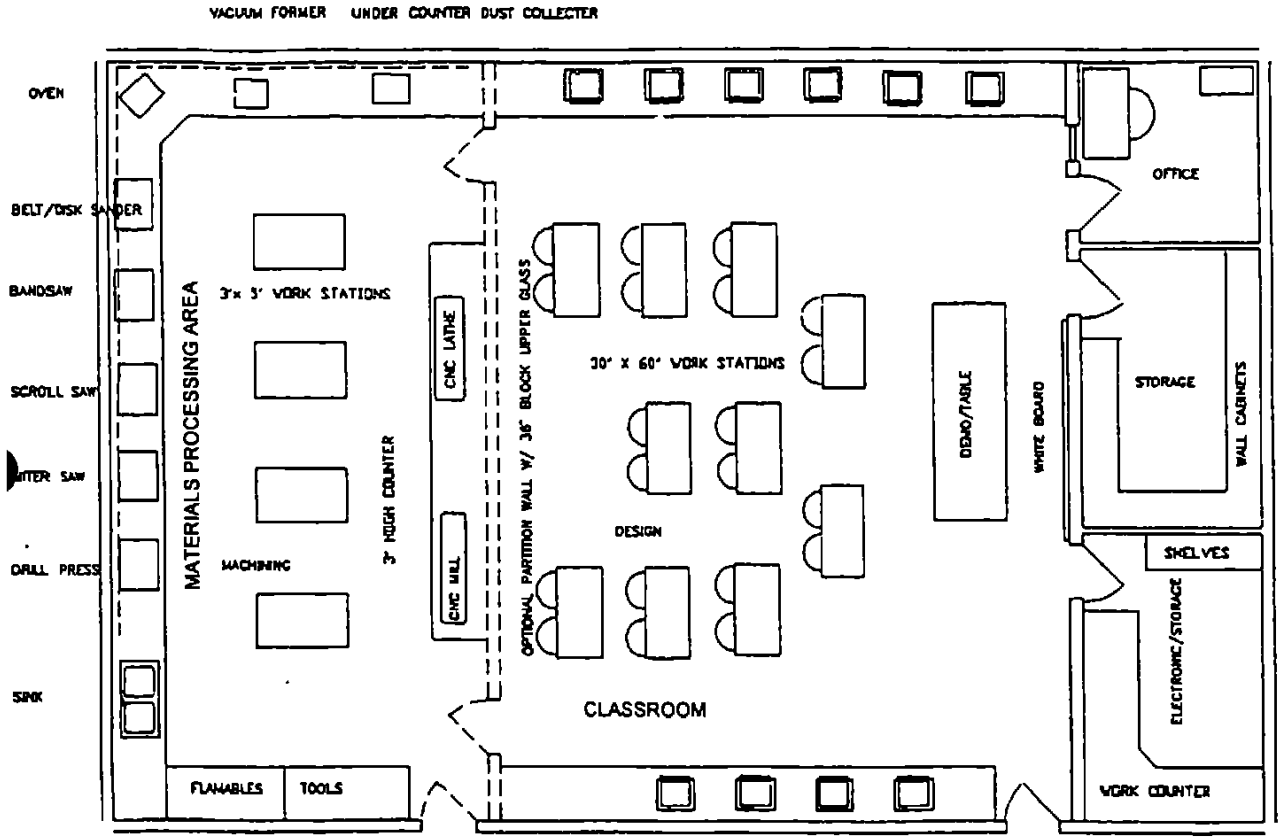
3. Manufacturing Systems, Structural Systems, and Transportation Systems require larger materials processing areas than shown on the Fundamentals of Technology sample plan.

4. Emergency disconnect switch to all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

Fundamentals of Technology

(NOTE: See Special Notes section for sample plan modifications for Communication Systems, Manufacturing Systems, Structural Systems, and Transportation Systems.)



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PROGRAM AREA: Technology Education

PROGRAM OR COURSE TITLE(S): Principles of Technology

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To provide an understanding of the principles and concepts of the physics of technology.
2. Types of Instruction:
   Lecture/demonstration; independent inquiry; small-group cooperative learning; laboratory-based experiences
3. Typical Activities:
   Hands-on experimentation with the four basic systems of physics, as applied to the workplace
4. Maximum Recommended Class Size: 20
5. Typical Length of Class Period: 90 minutes (block schedule); 55 minutes (traditional)
6. Typical Duration of Course: Semester (block schedule); Year (traditional)

RATIONALE FOR PROGRAM SELECTION:

Preparation for entry into technical, engineering, or science-related careers.

PROGRAM LOCATIONS AND RELATIONSHIPS:

May be appropriately located near science, mathematics, or other workforce development education programs

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   N.A.
2. Other Elective:
   N.A.
3. Academic:
   Physics
   Physical science

SPACE REQUIREMENTS:

1. Square Footage Range: 1,300-1,600
2. Peculiar Needs:
   A. Compressed air at each four-student work station
   B. Cold water supply at each four-student work station
   C. Two duplex outlets (120V.) per work station
3. Special Conditions:
   N.A.
4. Flexibility Needs:
   N.A.

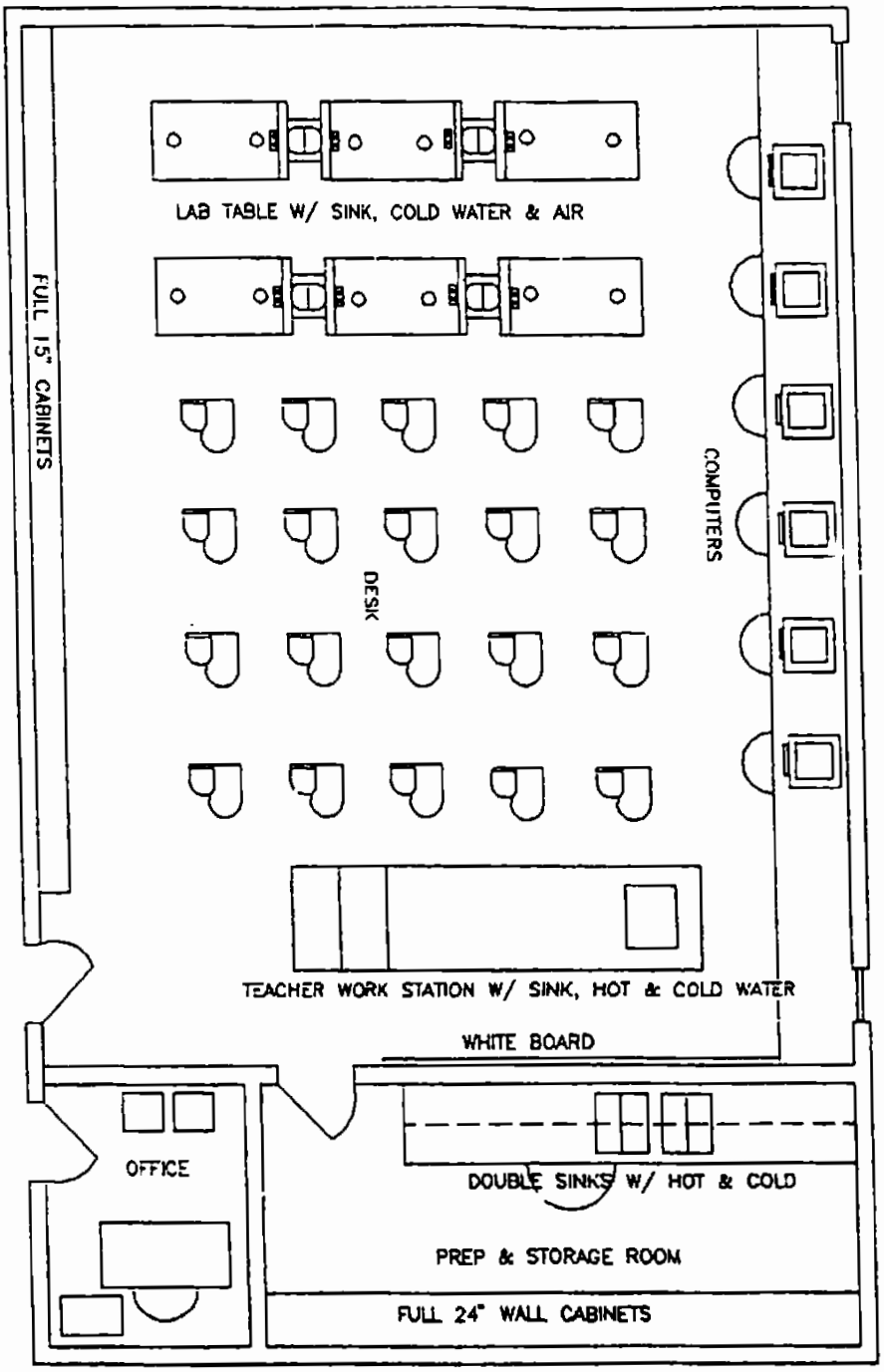
FURNISHINGS AND EQUIPMENT:

1. Typical Furniture:
    - A. Student desks
    - B. Physics-type laboratory stations
    - C. Demonstration table
2. Typical Casework:
    - A. Base cabinets on perimeter walls
    - B. Deep sink with hot and cold supply in prep room
    - C. Full-height storage cabinets with lockable glass doors
    - D. 30"-deep computer counters
3. Typical Equipment:
    - Portable science equipment

SPECIAL NOTES:

1. Adjustable shelves in all casework
2. Emergency disconnect switch to all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.


LAB TABLE W/ SINK, COLD WATER & AIR
FULL 15" CABINETS
COMPUTERS
DESK
TEACHER WORK STATION W/ SINK, HOT & COLD WATER
WHITE BOARD
OFFICE
DOUBLE SINKS W/ HOT & COLD
PREP & STORAGE ROOM
FULL 24" WALL CABINETS

TRADE AND INDUSTRIAL EDUCATION

PROGRAM AREA: Trade and Industrial Education

PROGRAM OR COURSE TITLE(S): Automotive Technology

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To provide technical skills needed to enter the automotive repair industry.
2. Types of Instruction:
   Lecture; hands-on practical application; computer application; cooperative learning
3. Typical Activities:
   Hands-on troubleshooting; bench labs; equipment training; cleaning procedures; component simulation
4. Maximum Recommended Class Size: Level I: 20
   Levels II/III: 16
5. Typical Length of Class Period: 90 minutes (block schedule)
   55 minutes (traditional) Auto. Tech I
   110 minutes (traditional) Auto. Tech. II/III
6. Typical Duration of Course: Semester (b¹ ck schedule) Auto. Tech. I
   Year (block schedule) Auto. Tech. II/III
   Year (traditional) All

RATIONALE FOR PROGRAM SELECTION:

Prepares for entry into employment and post-secondary training in automotive repair.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Should be separate from other spaces due to excessive noise and security issues.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   Collision Repair Technology (vehicle wash area and compound)
2. Other Elective:
   N.A.
3. Academic:
   N.A.

SPACE REQUIREMENTS:

1. Square Footage Range: 2,800-3,000 (shop only)
2. Peculiar Needs:
   A. Floor drains for washing floors
   B. Exhaust ventilation
   C. Emergency eyewash
   D. Overhead power supply

E. Compressed air
F. Hose bibbs inside and outside
G. Electric overhead doors
H. Fenced concrete compound outside shop doors
I. Computer terminals in shop and classroom
J. Hazardous materials storage
K. Beam-mounted overhead hoist

3. Special Conditions:
   A. Work benches require adjustable task lighting
   B. Drains in cleaning areas require grease traps
   C. Accommodations for oil and coolant recycling
4. Flexibility Needs:
   Optional overhead hoist system should serve entire shop area

FURNISHINGS AND EQUIPMENT:

1. Typical Furniture:
   A. Student tables and chairs
   B. Heavy-duty work benches
   C. Teacher desk and file cabinets
   D. Dry marker board and tack board
   E. Ceiling-mount AV screen
2. Typical Casework:
   A. Metal storage cabinets for tools and materials
   B. Instructional materials storage cabinet
   C. Bookshelves
3. Typical Equipment:
   General automotive diagnostic and service equipment

SPECIAL NOTES:

1. Pegboard on some wall space in tool storage areas
2. 208V. supply where indicated
3. 120V. duplex outlets @ 8'-0" OC where possible on perimeter walls
4. Adjustable shelves in all casework
5. Teacher office space with accessibility from and visibility into classroom and shop areas
6. Compressed air access along each wall with overhead reel drops @ 12'-0"
7. Emergency disconnect switch to all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

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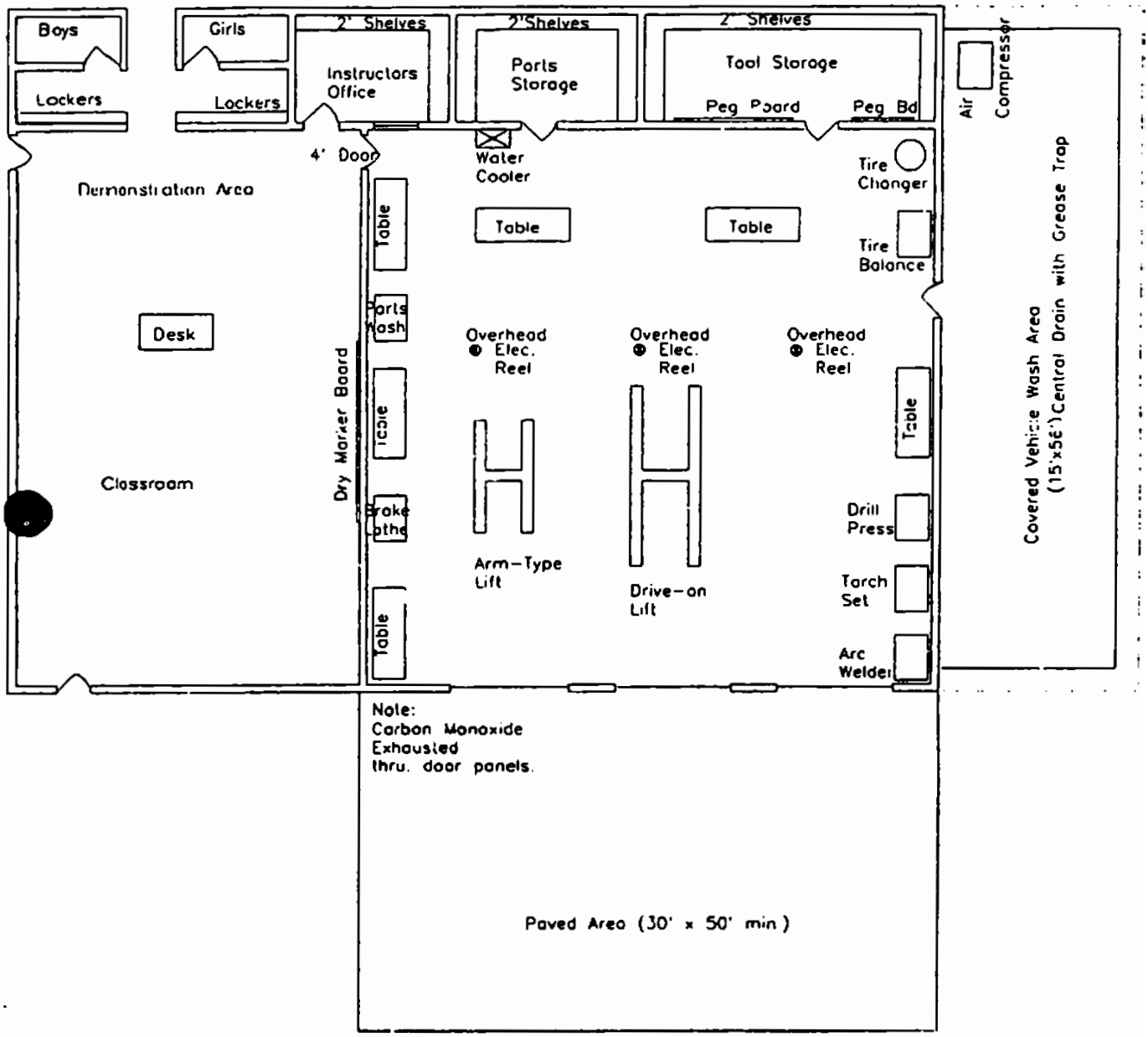
Automotive Technology



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PROGRAM AREA: Trade and Industrial Education

PROGRAM OR COURSE TITLE(S): Cabinetmaking

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To develop background and skills leading to entry into careers related to furniture and cabinetmaking or to further related training.
2. Types of Instruction:
   Lecture; demonstration; independent inquiry; small-group guided cooperative learning; project design and construction
3. Typical Activities:
   Materials identification; measurement and layout; safe hand, stationary, and portable power tool use; simple and complex project design and construction
4. Maximum Recommended Class Size: 16
5. Typical Length of Class Period: 90 minutes (block schedule); 110 minutes (traditional)
6. Typical Duration of Course: Year (block schedule); Year (traditional)

RATIONALE FOR PROGRAM SELECTION:

Provides career-oriented activities for the development of skills leading toward job entry and further training in furniture and cabinetmaking occupations.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Due to excessive noise and dust, should be located so as not to interfere with other instruction.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   N.A.
2. Other Elective:
   Classroom only
3. Academic:
   N.A.

SPACE REQUIREMENTS:

1. Square Footage Range: 2,000-2,400 (exclusive of storage, spray room, and classroom)
2. Peculiar Needs:
   A. Overhead door
   B. Dust collection system
   C. Spray room
   D. Storage, as indicated on sample plan
3. Special Conditions:
   A. Electrical drops (115V.) at work benches (four outlets per)
   B. Air compressor with four supply outlets (minimum)
   C. Power supply appropriate to equipment requirements

D. Emergency disconnect for all power except lighting

4. Flexibility Needs:

Work benches should not be attached to floo :.

FURNISHINGS AND EQUIPMENT:

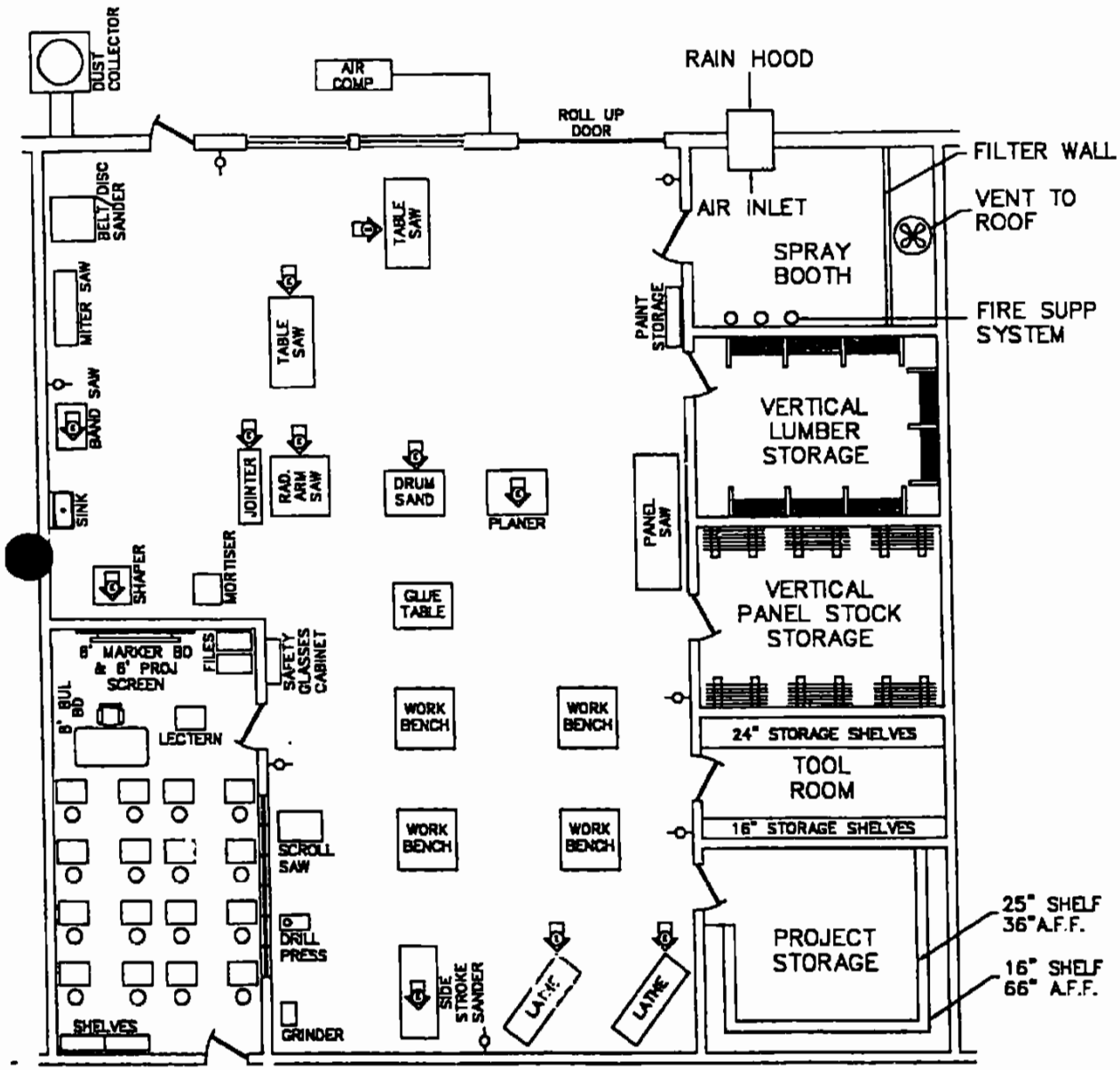
1. Typical Furniture:
   - A. Individual student tables and chairs
   - B. Teacher desk and file cabinets
   - C. Heavy-duty work benches
2. Typical Casework:
   - Bookcase
3. Typical Equipment:
   - A. Hand tools
   - B. Power tools
   - C. Work benches
   - D. Safety glasses cabinet

SPECIAL NOTES:

1. Deep sink with hot and cold supply in shop
2. Electrical receptacles @ 8'-0" on center on perimeter walls
3. Access to separate teacher workroom and office
4. Telephone
5. Emergency disconnect switch to all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

Cabinetmaking



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PROGRAM AREA: Trade and Industrial Education

PROGRAM OR COURSE TITLE(S): Collision Repair Technology

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To provide theory and application for the exploration of collision repair and for entry into employment or further training in the industry.
2. Types of Instruction:
   Lecture; demonstration; independent practice; group cooperative activities
3. Typical Activities:
   Demonstrations and group activities utilizing movable stations; independent practice utilizing full shop facilities; computerized estimating theory and practice
4. Maximum Recommended Class Size: 16
5. Typical Length of Class Period: 90 minutes (block schedule); 110 minutes (traditional)
6. Typical Duration of Course: Year(block); Year (traditional)

RATIONALE FOR PROGRAM SELECTION:

Provides for exploration of career opportunities and prepares for immediate employment upon program completion. Related skills include estimating, welding, painting, management, and leadership. A minimum of 50% of instructional time is hands-on.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Should be separated from other areas and programs due to excessive noise, use of hazardous materials, and fire safety concerns. Proximity to Automotive Technology program is desirable.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   Automotive Technology
2. Other Elective:
   N.A.
3. Academic:
   N.A.

SPACE REQUIREMENTS:

1. Square Footage Range: 2,800-3,200
2. Peculiar Needs:
   A. Computer stations (2)
   B. Visual access to shop from classroom
3. Special Conditions:
   A. Air exchange system
   B. Separate chemical storage
   C. Outside wash area
   D. Bench space in all work bays

4. Flexibility Needs:
   Metalwork bays should be situated to accommodate frequent rearrangement of work stations

FURNISHINGS AND EQUIPMENT:

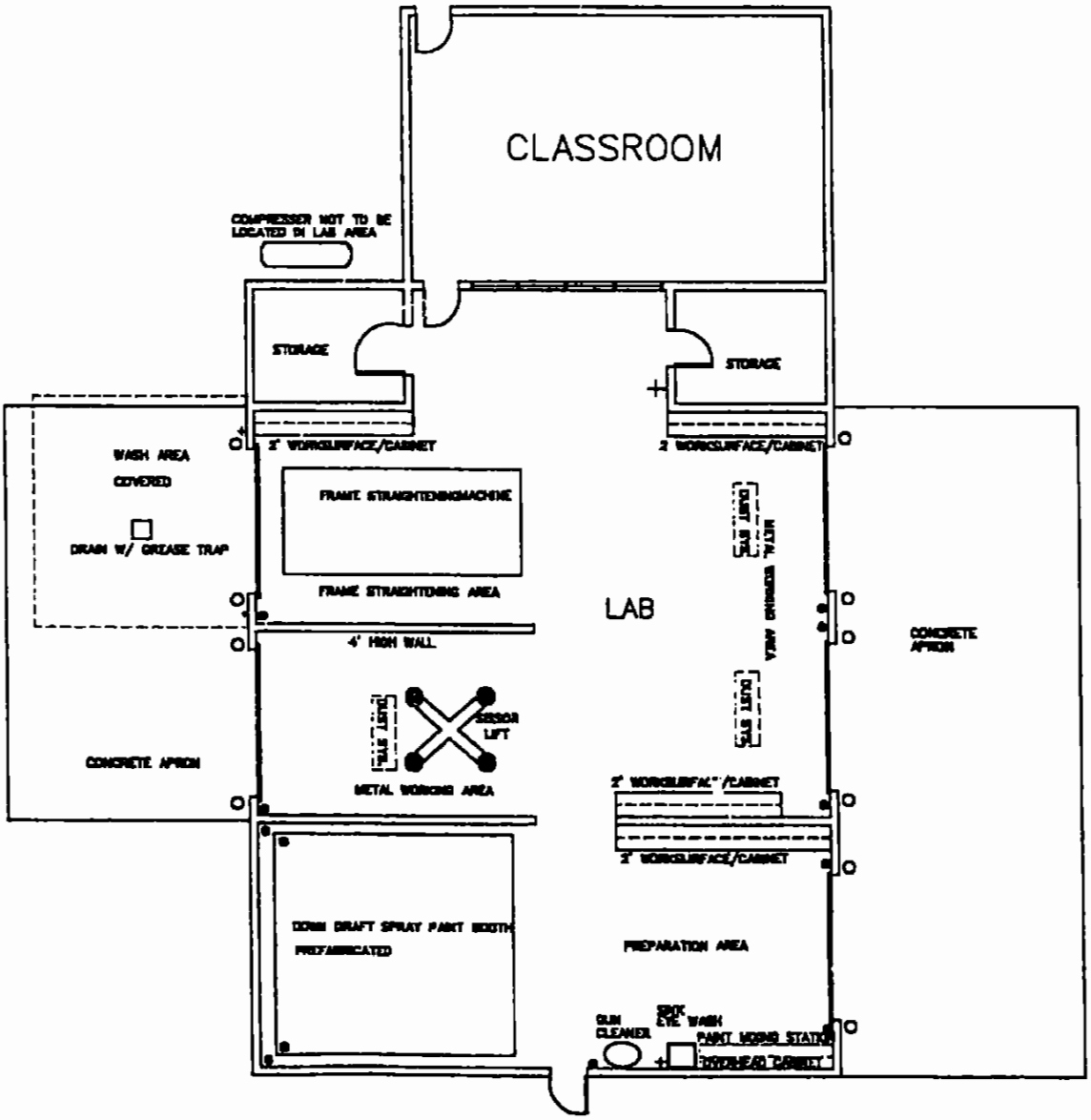
1. Typical Furniture:
   A. Student tables with chairs
   B. General classroom furniture
2. Typical Casework:
   A. Heavy-duty work benches with lockable storage beneath in all work areas
   B. Base cabinets on perimeter walls where space permits
3. Typical Equipment:
   A. Frame machine
   B. Down-draft paint booth (24'x20')
   C. Prep deck with ventilation
   D. Dust collection system
   E. 18' scissor (car) lift

SPECIAL NOTES:

1. GFI receptacles required
2. Noise and moisture control for air compressor housing
3. Receptacles in metalwork bays should be above counter height
4. Hose bibbs in prep bay and wash area
5. Compressed air throughout shop area
6. Paint gun washer near spray booth
7. Explosion-proof fixtures as required
8. 208V. service as required
9. 24"x24"wash basin with combination eyewash
10. Emergency disconnect switch to all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

Collision Repair Technology



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PROGRAM AREA: Trade and Industrial Education

PROGRAM OR COURSE TITLE(S): Construction Technology

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To provide training and experience leading to a tentative career or further training.
2. Types of Instruction:
   Lecture; demonstration; independent and guided practice; live projects
3. Typical Activities:
   Individual; small-group and large-group projects
4. Maximum Recommended Class Size: Level I: 20;
   Levels II/III: 16
5. Typical Length of Class Period: 90 minutes (block schedule)
   55 minutes (traditional) Const. Tech. I
   110 minutes (traditional) Const. Tech. II/III
6. Typical Duration of Course:
   Semester (block schedule) Const. Tech. I
   Year (block schedule) Const. Tech. II/III
   Year (traditional) All

RATIONALE FOR PROGRAM SELECTION:

Provides training in specialized skills leading to initial employment and further training in residential and commercial carpentry.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Should be located away from more traditional classroom activities due to excessive noise levels.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   A. Agricultural Production
   B. Cabinetmaking
2. Other Elective:
   N.A.
3. Academic:
   N.A.

SPACE REQUIREMENTS:

1. Square Footage Range: 2,200-2,600
2. Peculiar Needs:
   A. Spray booth with filtered exhaust system and explosion-proof electrical and mechanical equipment
   B. Storage
      1) Paints; flammable materials

2) Ladders; wheelbarrows; scaffolding; unfinished projects; specialty lumber; live project materials (est. 16'x24')
3) Tools; machine accessories; laser transits (est. 9'x12')
4) Lumber; building materials

C. Deep sink with emergency eyewash
D. Drinking fountain
E. Overhead door -12' high x 10' wide
F. Outside staging area for construction of live projects with (est.) 20'x40' overhead cover
G. Student changing area with lockers

3. Special Conditions:
   A. Pull-down overhead power outlet reels at work benches
   B. Noise control in walls
   C. All wall electrical outlets @ 48" above floor
   D. Access to local computer network and Internet
   E. Hose bib inside and outside
   F. 120V. outlets and one 240V. outlet at outside staging area
   G. Access to instructor toilet with shower
4. Flexibility Needs:
   Power panel adequate to accommodate future equipment upgrades

FURNISHINGS AND EQUIPMENT:

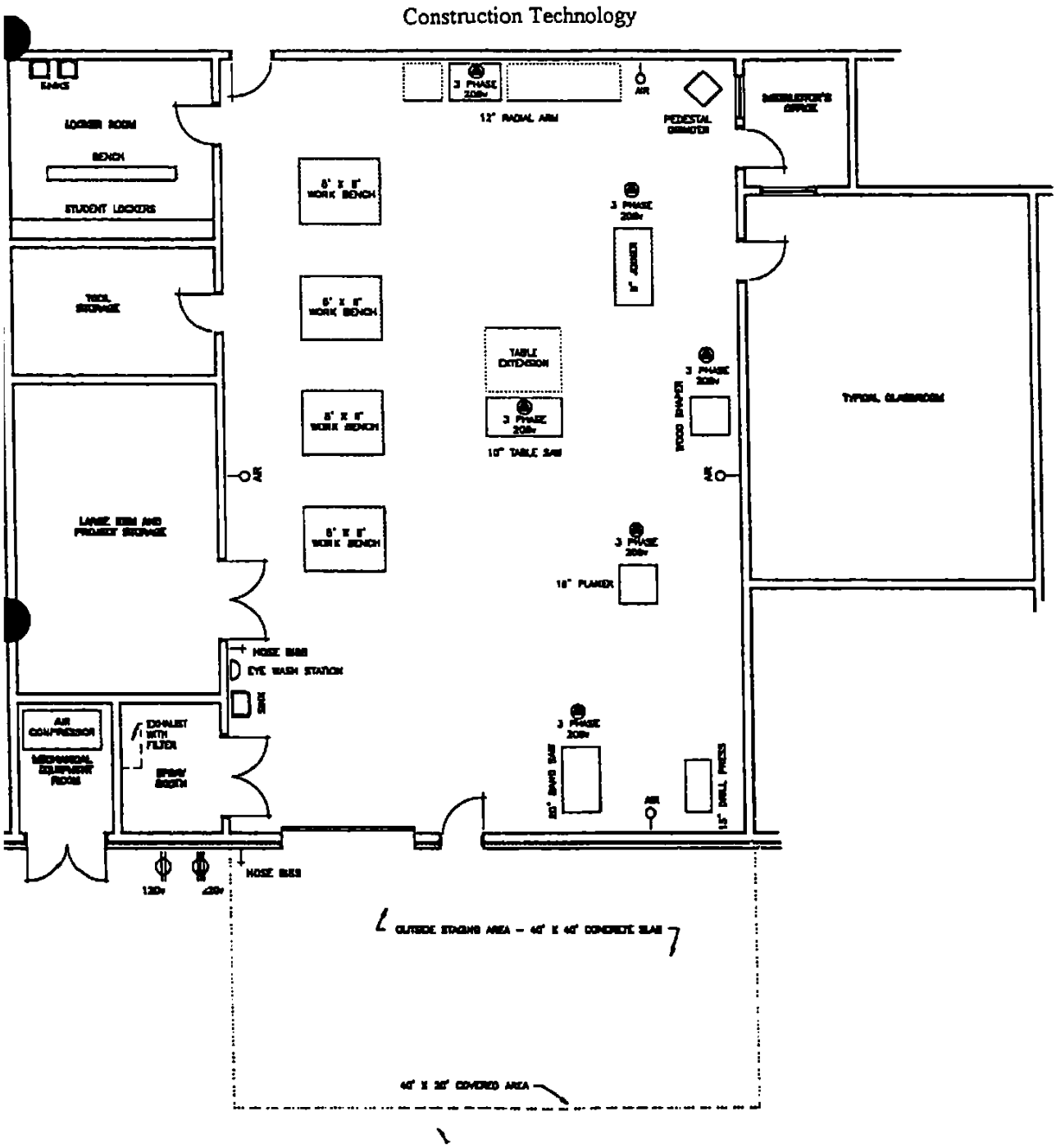
1. Typical Furniture:
   A. Heavy-duty four-station work benches with laminated wood tops and corner vices and with storage cabinets beneath
   B. Portable, lockable computer cabinet
   C. Individual student tables with chairs in classroom
2. Typical Casework:
   A. Units for horizontal and vertical storage of large sheet materials
   B. Tool cabinets
   C. Bookcase
3. Typical Equipment:
   A. Hand and portable power tools
   B. Large stationary equipment and power tools
   C. Air compressor

SPECIAL NOTES:

1. Dust collection system
2. Emergency disconnect switch to all equipment and outlets except lights
3. Telephone outlet with flashing light
4. Laboratory contiguous to classroom
5. Compressed air outlets for pneumatic tools

SAMPLE FLOOR PLAN: See next page.

Construction Technology



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PROGRAM AREA: Trade and Industrial Education

PROGRAM OR COURSE TITLE(S): Cosmetology

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To prepare for State Board Exam (theory and practical) and for employment.
2. Types of Instruction:
   Lecture; demonstration; hands-on application
3. Typical Activities:
   Mannequin performances; live-model (to include the public) performances
4. Maximum Recommended Class Size: Level I: 20
   Levels II/III: 16
5. Typical Length of Class Period: 3 hours: Cosmetology I
   3 hours: Cosmetology II
6. Typical Duration of Course: Year

RATIONALE FOR PROGRAM SELECTION:

Prepares for employment in the cosmetology field.

PROGRAM LOCATIONS AND RELATIONSHIPS:

May be located within any instructional area of the school, but requires accessibility to the public and to public parking to accommodate client movement to and from the laboratory.

SHARED SPACE OPTIONS:

N.A.

SPACE REQUIREMENTS:

1. Square Footage Range: 2,180: 20 stations/50 (maximum) students
   3,240: 30 stations/60 (maximum) students
2. Peculiar Needs:
   A. Requires 30 hairdressing stations
   B. Requires beginner department for at least 20 students, with one mannequin each and at least 40' between mannequins
   C. 10 manicure tables at least two feet apart
   D. One computer station
   E. Facial room (10'x10' minimum)
   F. Lockable supply storage room
   G. Reception area
   H. Dressing room with lockable student lockers
   I. Classroom with individual student tables and chairs, teacher desk and chair, and T.V./VCR on cart
   J. Dispensary suitable for mixing chemicals, with hot and cold supply and washer and dryer
   K. Washable floor covering in all laboratory areas

L. Bathroom facilities for public use
M. Separate office with telephone required
N. Manicure, pedicure, and artificial nail area with adequate ventilation
O. Piped music for simulated salon in senior laboratory
P. Snack vending area

3. Special Conditions:
   A. Must meet North Carolina State Board of Cosmetic Art Examiners requirements, Statutory Authority G.S.88-23, Subchapter 14G.0003 (space requirements)
   B. Accessible to handicapped
4. Flexibility Needs:
   N.A.

FURNISHINGS AND EQUIPMENT:

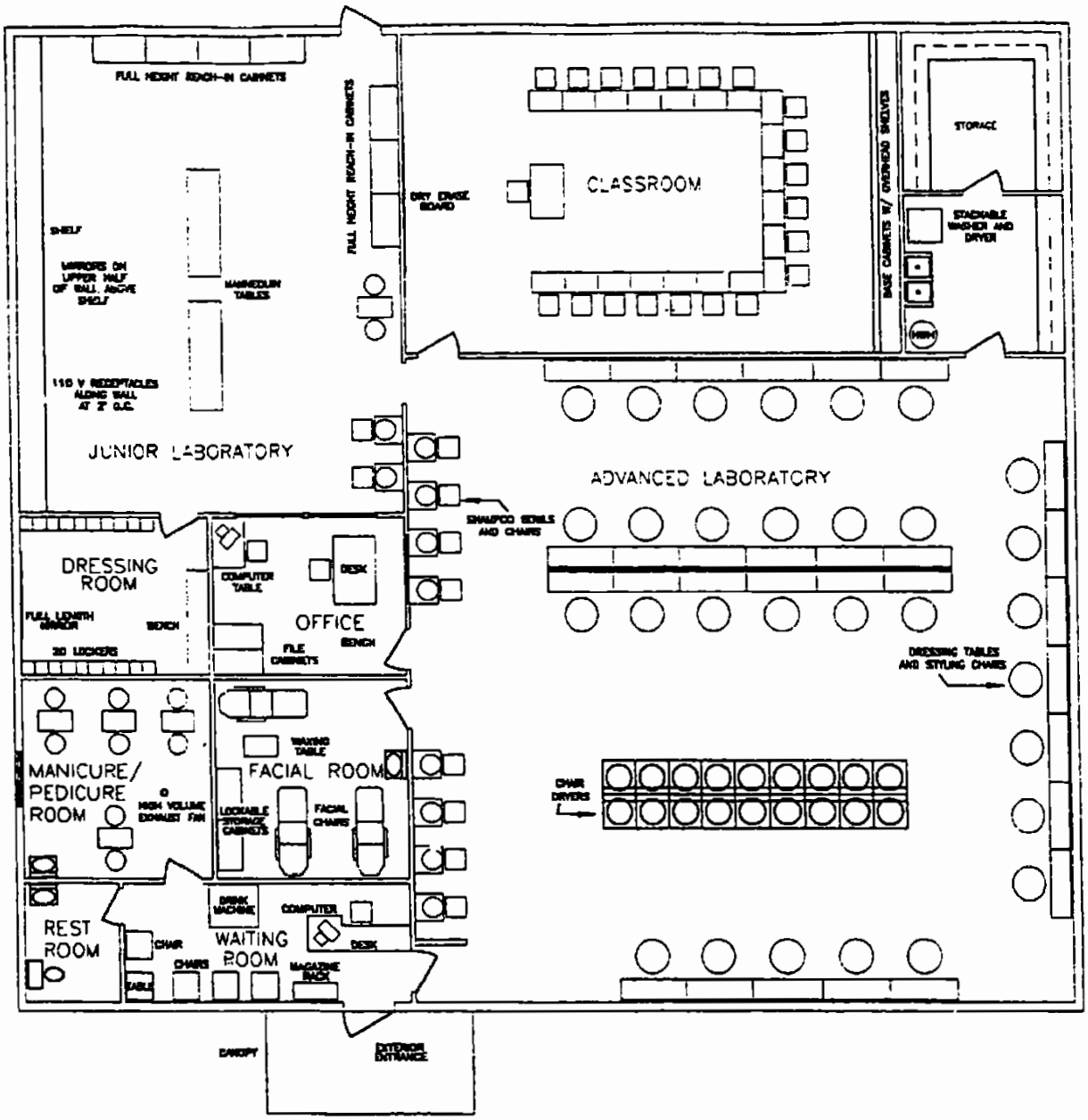
1. Typical Furniture:
   A. Advanced lab:
      1) Four manicure tables and stools
      2) Eighteen chair dryers
      3) Eight shampoo bowls and chairs
      4) Thirty dressing tables with mirrors and hydraulic styling chairs
      5) Three facial chairs
   B. Beginner lab:
      1) One manicure table
      2) Two shampoo bowls
      3) Mannequin table to accommodate ten students (minimum)
      4) 20 working stations with mirrors
2. Typical Casework:
   A. Shelves in dispensary
   B. Double sink with hot and cold supply in dispensary
   C. Wall cabinets for storage of equipment and supplies
3. Typical Equipment:
   A. One wet-and-dry sterilizer for each work table
   B. Thermal styling equipment

SPECIAL NOTES:

1. GFI electrical receptacles on each work station
2. Shelf and closed cabinet on wall above each shampoo bowl
3. Governed by North Carolina Administrative Code, Title 21 Occupational Licensing Boards, Chapter 14 Board of Cosmetic Art Examiners
4. Emergency disconnect switch to all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

Cosmetology



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PROGRAM AREA: Trade and Industrial Education

PROGRAM OR COURSE TITLE(S): Drafting

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To provide training in the use of simple and complex graphic tools to communicate ideas and concepts in the areas of architecture, manufacturing, engineering, mathematics and the sciences.
2. Types of Instruction:
   Lecture; demonstration; individual inquiry; small-group cooperative learning; individual and small-group viewing of video programs
3. Typical Activities:
   Individual production of technical drawings using conventional and computer-aided drawing equipment; sketching; individual and small-group design projects involving cutting, gluing, and assembling; maintenance of tables and equipment
4. Maximum Recommended Class Size: 20
5. Typical Length of Class Period: 90 minutes (block schedule); 55 minutes (traditional)
6. Typical Duration of Course: Semester (block): Year (traditional)

RATIONALE FOR PROGRAM SELECTION:

Success in all areas of business and industry is predicated on the ability to communicate effectively. Complex graphic tools are used in all facets of the economy, including the sciences, for analyzing and sharing information. This program prepares the student to effectively use these communication tools.

PROGRAM LOCATIONS AND RELATIONSHIPS:

May be the center for the school's most sophisticated computer activities and appropriately located contiguous to other computer-oriented programs. May be a part of an integrated approach to math and science and located accordingly. Need not be located near other trade and industrial education programs.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   Fundamentals of Technology
   Computer Applications (depending upon the number of computers)
   Graphic Communications
   Scientific and Technical Visualization
2. Other Elective:
   Art
3. Academic:
   Mathematics
   Science

SPACE REQUIREMENTS:

1. Square Footage Range: 1,800-2,200
2. Peculiar Needs:
   A. Deep sink with hot and cold supply
   B. Appropriate ventilation for Diazo printer
   C. 100 footcandles of artificial lighting required for drawing
3. Special Conditions:
   N.A.
4. Flexibility Needs:
   N.A.

FURNISHINGS AND EQUIPMENT:

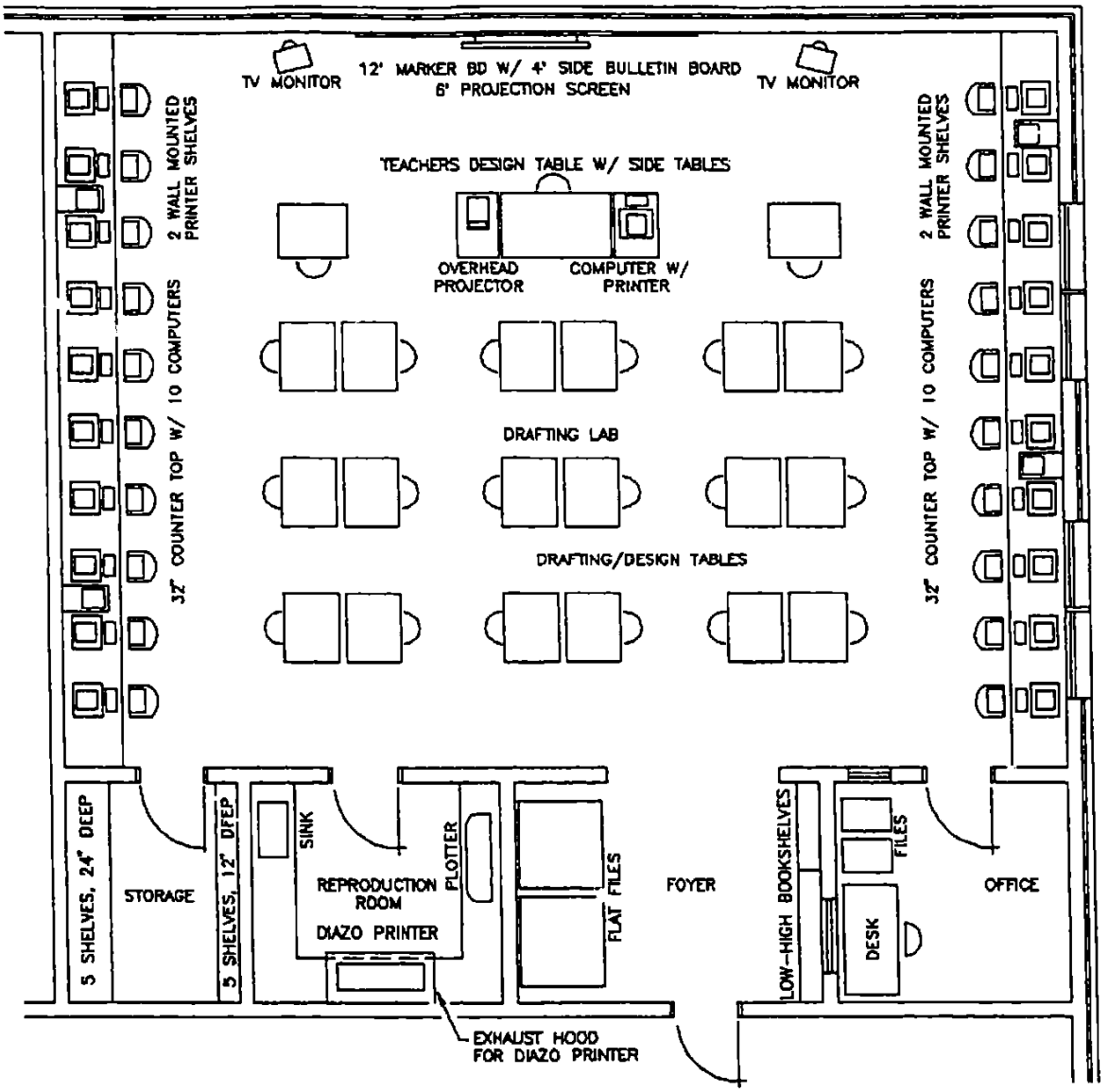
1. Typical Furniture:
   A. Drafting tables (to accommodate size "C" paper) and stools
   B. Flat tracing files (ten drawers, minimum)
   C. Teacher drawing table and desk and file cabinets
   D. Lockable storage cabinets with shelves for drawing equipment and software
2. Typical Casework:
   A. Bookshelves for reference books, magazines, and manuals
   B. Storage shelves for drawing and reproduction media up to size "D" sheets
   C. Storage shelves for student models and projects
   D. Storage for Diazo machine filters and ammonia
   E. Counters to accommodate twenty computers and four printers, or counters for printers only, if drafting tables are designed to accommodate computers
   F. Counter space for a size "A"-"D" plotter or printer, a Diazo reproduction machine, and a paper cutter
3. Typical Equipment:
   A. Size "D" plotter or printer
   B. Computers for CAD
   C. Printers
   D. T.V. monitors for display of computer software techniques
   E. Computer-to-T.V. display equipment or computer projection device
   F. Small hand tools for project construction
   G. CAD/CAM

SPECIAL NOTES:

1. Perimeter electrical outlets above counter height
2. Accessible to local school network and Internet
3. Light dimmers near teacher station for use of projectors and T.V. monitors

SAMPLE FLOOR PLAN: See next page.

Drafting



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PROGRAM AREA: Trade and Industrial Education

PROGRAM OR COURSE TITLE(S): Electrical Trades

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To provide skills and experience for initial employment in the electrical trades industry and for continued lifelong learning experiences.
2. Types of Instruction:
   Lecture; demonstration; hands-on work simulations
3. Typical Activities:
   Small-group simulations; hands-on activities conducted at movable work stations by groups of two
4. Maximum Recommended Class Size: Level I: 20
   Levels II/III: 16
5. Typical Length of Class Period: 90 minutes (block schedule): All levels
   55 minutes (traditional): Level I
   110 minutes (traditional): Levels II/III
6. Typical Duration of Course: Semester (block schedule): Level I
   Year (block schedule): Levels II/III
   Year (traditional): All levels

RATIONALE FOR PROGRAM SELECTION:

Provides skill development leading to entry-level employment or further training in the electrical trades industry.

PROGRAM LOCATIONS AND RELATIONSHIPS:

May appropriately be located in proximity to other trade and industrial education courses where noise levels, nature of educational activities, and observance of joint safety practices are considerations.

SHARED SPACE OPTIONS:

N.A.

SPACE REQUIREMENTS:

1. Square Footage Range: 1,800-2,400
2. Peculiar Needs:
   A. Accessibility to 3-phase power
   B. At least one single-phase 240V. receptacle on each laboratory wall
   C. Storage for electrical equipment and supplies
   D. Individual student lockers
   E. Deep sink with hot and cold supply in laboratory
   F. Water fountain in laboratory
3. Special Conditions:
   All 120V. receptacles to be on GFI circuits for student safety

4. Flexibility Needs:
   Classroom furniture and shop work stations should be easily rearranged

FURNISHINGS AND EQUIPMENT:

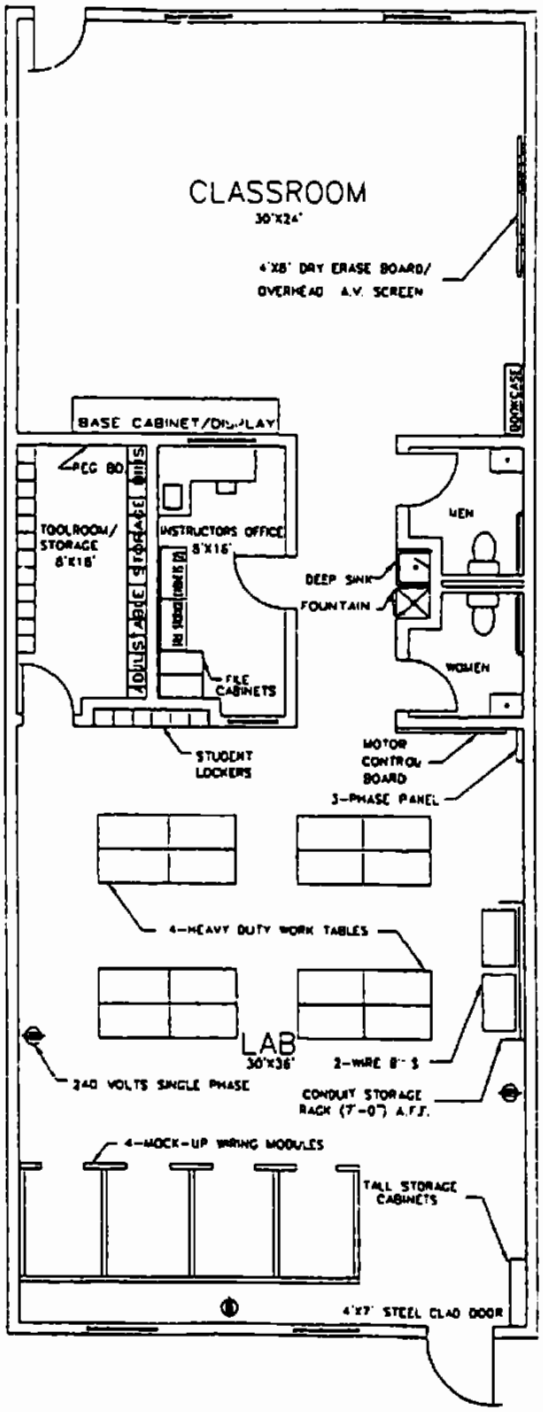
1. Typical Furniture:
   A. Individual student tables and chairs in classroom
   B. Heavy-duty four-station work tables
   C. Teacher desks--one in laboratory and one in office
2. Typical Casework:
   Full-height lockable storage cabinets in shop(minimum of 2) and classroom (minimum of one)
3. Typical Equipment:
   A. Small hand and power tools
   B. Dry marker board and tack boards
   C. Ceiling-mount AV screen
   D. Computer with local network and Internet connections

SPECIAL NOTES:

1. Provide ceiling hung electrical receptacles in center area of laboratory
2. Access to teacher work space and office outside classroom
3. Electrical receptacles (120V.) at 48" above floor every 8'-0" where possible on perimeter walls
4. Emergency disconnect switch for all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

Electrical Trades



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PROGRAM AREA: Trade and Industrial Education

PROGRAM OR COURSE TITLE(S): Electro-mechanical Technology

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To prepare for entry into occupations related to the installation and maintenance of industrial equipment and for further related training.
2. Types of Instruction:
   Lecture; demonstration; independent inquiry; small-group cooperative learning
3. Typical Activities:
   Small-group simulations and exploratory activities; individual and group hands-on activities conducted at six to eight centers by from one to four students each
4. Maximum Recommended Class Size: Level I: 20
   Levels II/III: 16
5. Typical Length of Class Period: 90 minutes (block schedule): All levels
   55 minutes (traditional): Level I
   110 minutes (traditional): Levels II/III
6. Typical Duration of Course: Semester (block schedule): Level I
   Year (block schedule): Levels II/III
   Year (traditional): All levels

RATIONALE FOR PROGRAM SELECTION:

Prepares for employment or further training in electro-mechanical and related occupations through skill development in layout, design, assembly, testing, maintenance, and service of industrial equipment.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Should not be located where interference with other instruction can occur due to excessive noise.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   Welding
   Electrical Trades
   Electronics
   Metals Manufacturing Technology
2. Other Elective:
   N.A.
3. Academic:
   Physical Science
   Physics

SPACE REQUIREMENTS:

1. Square Footage Range: 2,000-2,400 (Includes classroom and storage)

2. Peculiar Needs:
   A. Separate classroom accessible to laboratory stations
   B. Three-phase current available--four wires pulled to all laboratory outlets
   C. Oxygen, acetylene, and L.P. stored outside and piped inside
   D. Safety station with eyewash
   E. Compressed air piped in
   F. Overhead door
   G. Hand wash station
   H. Networked for multimedia access
3. Special Conditions:
   A. Windows between classroom and laboratory
   B. Lockable tool and materials storage
4. Flexibility Needs:
   A. Student furniture which is easily rearranged
   B. Multi-function student work stations

FURNISHINGS AND EQUIPMENT:

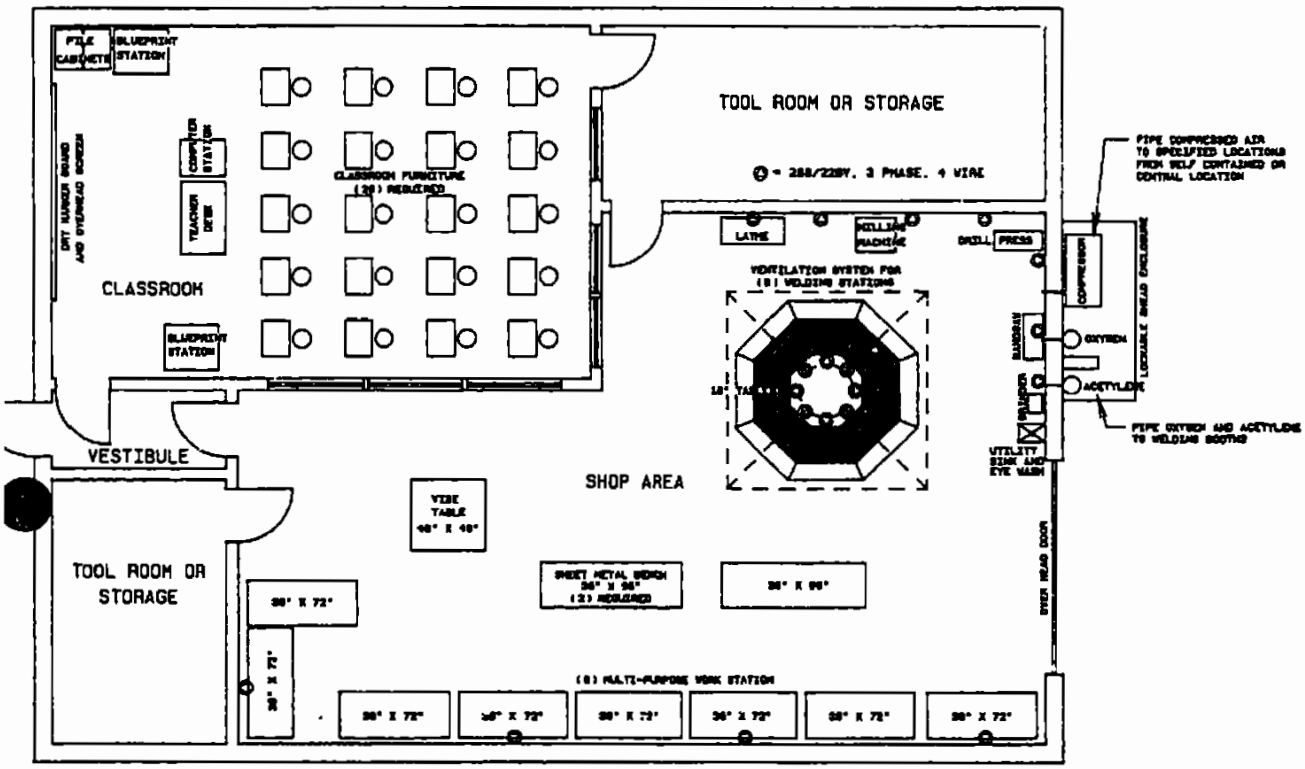
1. Typical Furniture:
   A. Teacher desk with file cabinets
   B. Computer work station
   C. Drafting/blueprint reading work stations
   D. Individual student tables and chairs
   E. 30"x72" heavy-duty multi-purpose work stations with dividers and stools (8)
   F. 36"x96" heavy-duty sheet metal bench with stake plates
   G. 36"x96" heavy-duty sheet metal bench with two machine vises
   H. 48"x48" heavy-duty work bench with four machine vises
2. Typical Casework:
   Enclosed book storage cabinet
3. Typical Equipment:
   A. Multi-purpose welding stations with U.V.-protected curtains
   B. Industrial trainers

SPECIAL NOTES:

1. Live projects utilized for skill development
2. 120V. and 240V. electrical receptacles required
3. Emergency disconnect switch for all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

Electro-mechanical Technology



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PROGRAM AREA: Trade and Industrial Education

PROGRAM OR COURSE TITLE(S): Electronics

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To provide an introduction to alternating and direct current electronics and advanced electronics systems leading to initial employment or further training in electronics occupations.
2. Types of Instruction:
   Lecture; demonstration; independent and small-group exercises; computer-assisted instruction
3. Typical Activities:
   Small-group activities at work benches and individual computer assignments
4. Maximum Recommended Class Size: Level I: 20
   Levels II/III: 16
5. Typical Length of Class Period: 90 minutes (block schedule): All levels
   55 minutes (traditional): Level I
   110 minutes (traditional): Levels II/III
6. Typical Duration of Course: Semester (block schedule): Level I
   Year (block schedule): Levels II/III
   Year (traditional): All levels

RATIONALE FOR PROGRAM SELECTION:

Supports entry directly into the electronics or related career fields and into further training in related areas, such as engineering.

PROGRAM LOCATIONS AND RELATIONSHIPS:

May be located in any area of the school and need not be in proximity to other workforce development education programs.

SHARED SPACE OPTIONS:

Science

SPACE REQUIREMENTS:

1. Square Footage Range: 2,000-2,400 (laboratory and classroom)
2. Peculiar Needs:
   A. Full-height reach-in cabinets for student project and equipment storage
   B. Optional raised floor or in-floor conduit to permit wiring of work stations without use of power columns, or use drop cord and plug assembly
   C. Storage room with full-height adjustable perimeter shelving for textbooks and larger items of equipment
   D. Workbenches which accommodate computer-based instruction
   E. Compressed air supply

3. Special Conditions:
   A. Work benches should provide storage for circuit boards and other materials
   B. Room-darkening shades for use with LCDs
   C. Quadraplex outlets @ 6'-0" o.c. on work benches along side walls
4. Flexibility Needs:
   N.A.

FURNISHINGS AND EQUIPMENT:

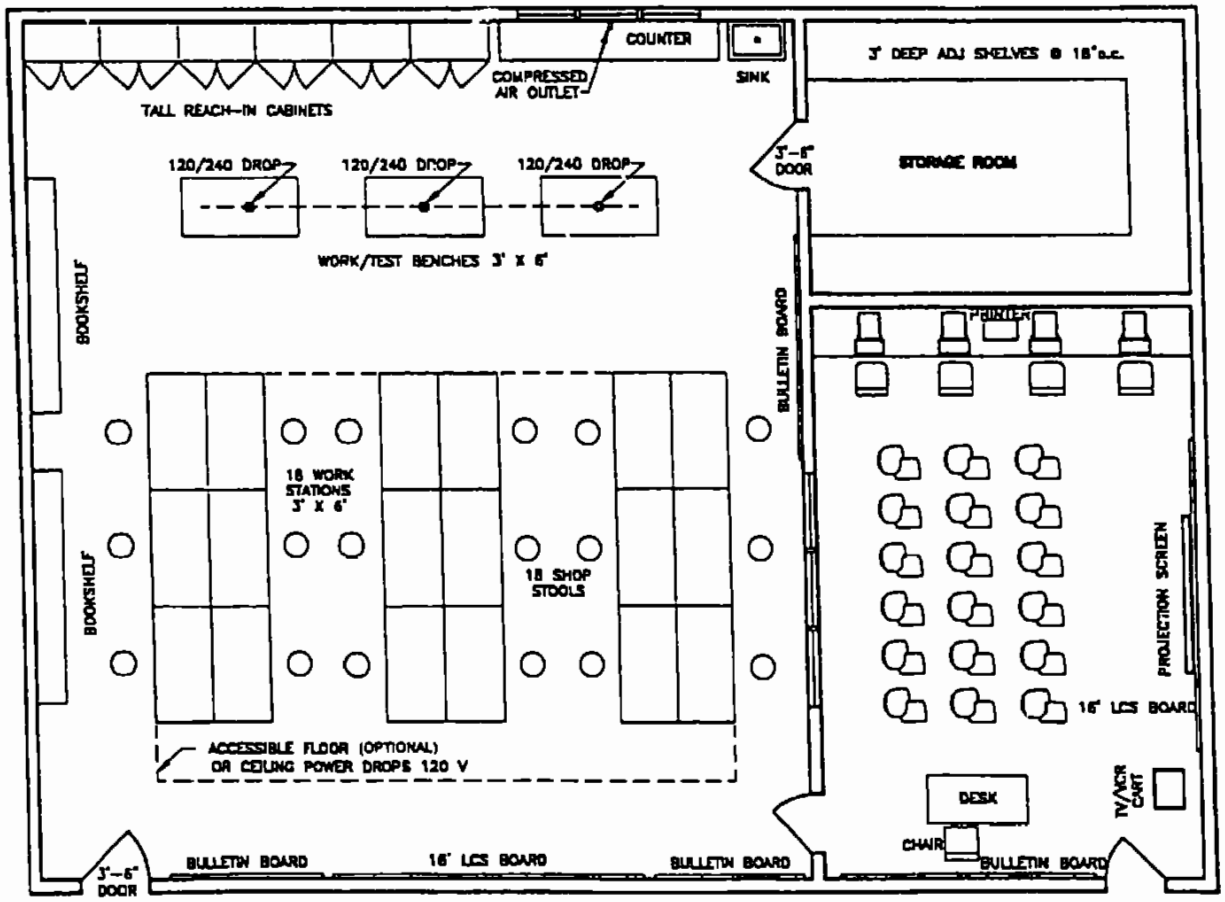
1. Typical Furniture:
   A. Work benches with laminated wood tops and storage beneath
   B. Teacher desk and file cabinets
2. Typical Casework:
   See Item 2. in Space Requirements above
3. Typical Equipment:
   A. Computer assisted classroom:
      1) Networked computers at each work station
      2) Laser printer
      3) Small hand tools
      4) Test equipment
   B. Traditional setting:
      1) Computers
      2) Printer
      3) Small hand tools
      4) Test equipment

SPECIAL NOTES:

Emergency disconnect switch for all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

Electronics



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PROGRAM AREA: Trade and Industrial Education

PROGRAM OR COURSE TITLE(S): Graphic Communications

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To provide entry-level job skills and background for further training through emphasis on printing production, publishing, and packaging, as they relate to graphic communications and imaging technology.
2. Types of Instruction:
   Lecture; demonstration; hands-on projects
3. Typical Activities:
   Desktop publishing; photography; image assembly; presswork; finishing and binding; screen printing
4. Maximum Recommended Class Size: Level I: 20
   Levels II/III: 16
5. Typical Length of Class Period: 90 minutes (block schedule): All levels
   55 minutes (traditional): Level I
   110 minutes (traditional): Levels II/III
6. Typical Duration of Course: Semester (block schedule): Level I
   Year (block schedule): Levels II/III
   Year (traditional): All levels

RATIONALE FOR PROGRAM SELECTION:

Training and experiences provide entry-level skills for printing and related occupations and foundations for further training.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Should be located on ground level floor, with direct outside access for moving large equipment and printing supplies. A loading dock is desirable.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   N.A.
2. Other Elective:
   Visual Arts
3. Academic:
   N.A.

SPACE REQUIREMENTS:

1. Square Footage Range: 2,000-2,800
2. Peculiar Needs:
   A. Zoned temperature control
   B. Adequate ventilation
   C. Space for ten computers; two printers; one scanner

D. Counters for binding equipment
E. Dedicated phone line (Internet access)
F. Hot and cold water supply
G. High pressure spray booth for screen printing
H. Interior walls windowed

3. Special Conditions:
   A. Access to 240V. power overhead
   B. Acoustical ceiling tile
   C. Compressed air available
   D. Flammables storage
   E. Anti-glare exterior light source
   F. Non-glare classroom lighting
4. Flexibility Needs:
   Individual student tables and chairs

FURNISHINGS AND EQUIPMENT:

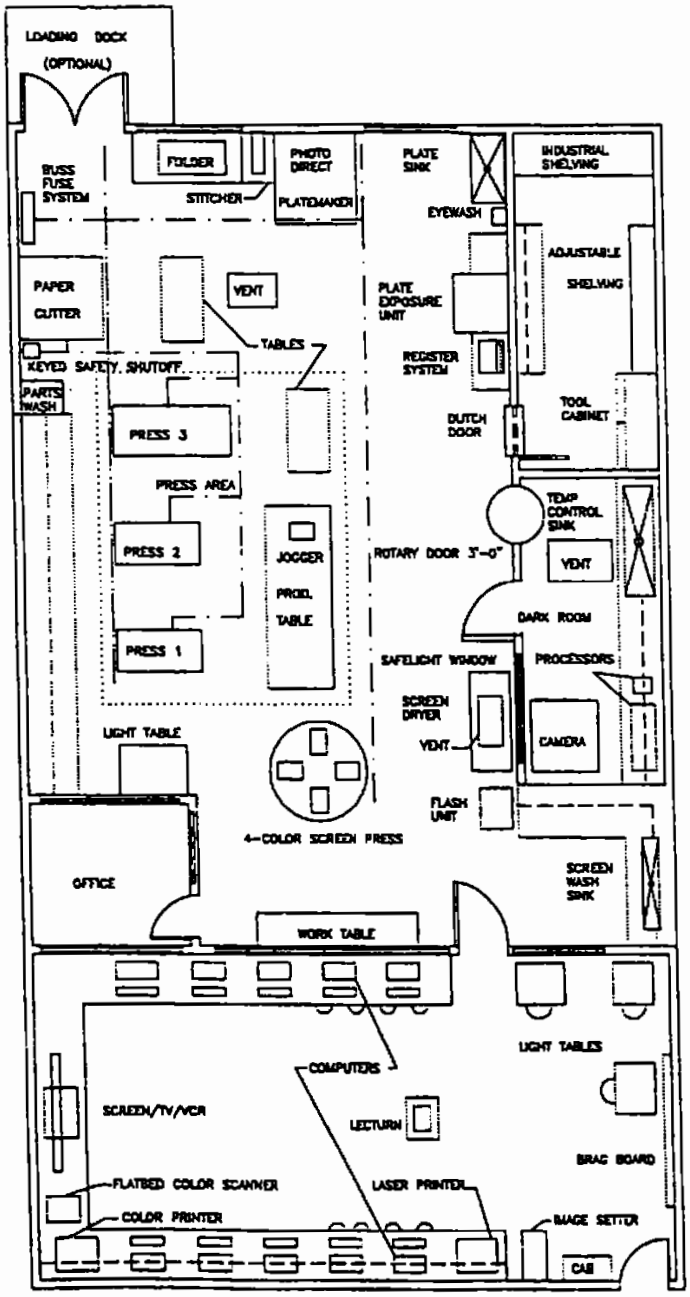
1. Typical Furniture:
   A. Work/storage tables
   B. Computer work station in office
   C. File cabinets
2. Typical Casework:
   A. Computer counter
   B. Base cabinets with storage beneath where possible in laboratory area
3. Typical Equipment:
   A. Presses
   B. Paper cutter
   C. Plate maker
   D. Folder
   E. Vertical camera
   G. Paper drill
   H. Image setter
   I. Film processor
   J. Light tables
   K. Collator
   L. Saddle stitcher
   M. Center punch
   N. Screen press
   O. Belt dryer

SPECIAL NOTES:

1. Excess tack boards
2. Emergency disconnect switch for all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

Graphic Communications



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PROGRAM AREA: Trade and Industrial Education

PROGRAM OR COURSE TITLE(S): Masonry

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To provide skills which can lead to initial employment and further training in masonry and related occupations.
2. Types of Instruction:
   Lecture; demonstration; individual and group hands-on activities
3. Typical Activities:
   Individual and group simulations and activities; construction of masonry walls and other projects
4. Maximum Recommended Class Size: Level I: 20
   Levels II/III: 16
5. Typical Length of Class Period: 90 minutes (block schedule); 110 minutes (traditional)
6. Typical Duration of Course: Semester (block schedule); Year (traditional)

RATIONALE FOR PROGRAM SELECTION:

Provides learning experiences which develop entry-level skills in masonry and related occupations.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Should be located on ground level with outside access and in proximity to other workforce development laboratories where noise and dust are considerations.

SHARED SPACE OPTIONS:

N.A.

SPACE REQUIREMENTS:

1. Square Footage Range: 2,600-3,000 (exclusive of storage and office)
2. Peculiar Needs:
   A. Fenced outside storage yard
   B. Secure, covered outside storage area
   C. Access to student dressing and locker area with lavatories
   D. Outside storage for masonry sand
3. Special Conditions:
   A. Inside mortar mixing area
   B. Dust removal area
   C. Overhead door
4. Flexibility Needs:
   N.A.

FURNISHINGS AND EQUIPMENT:

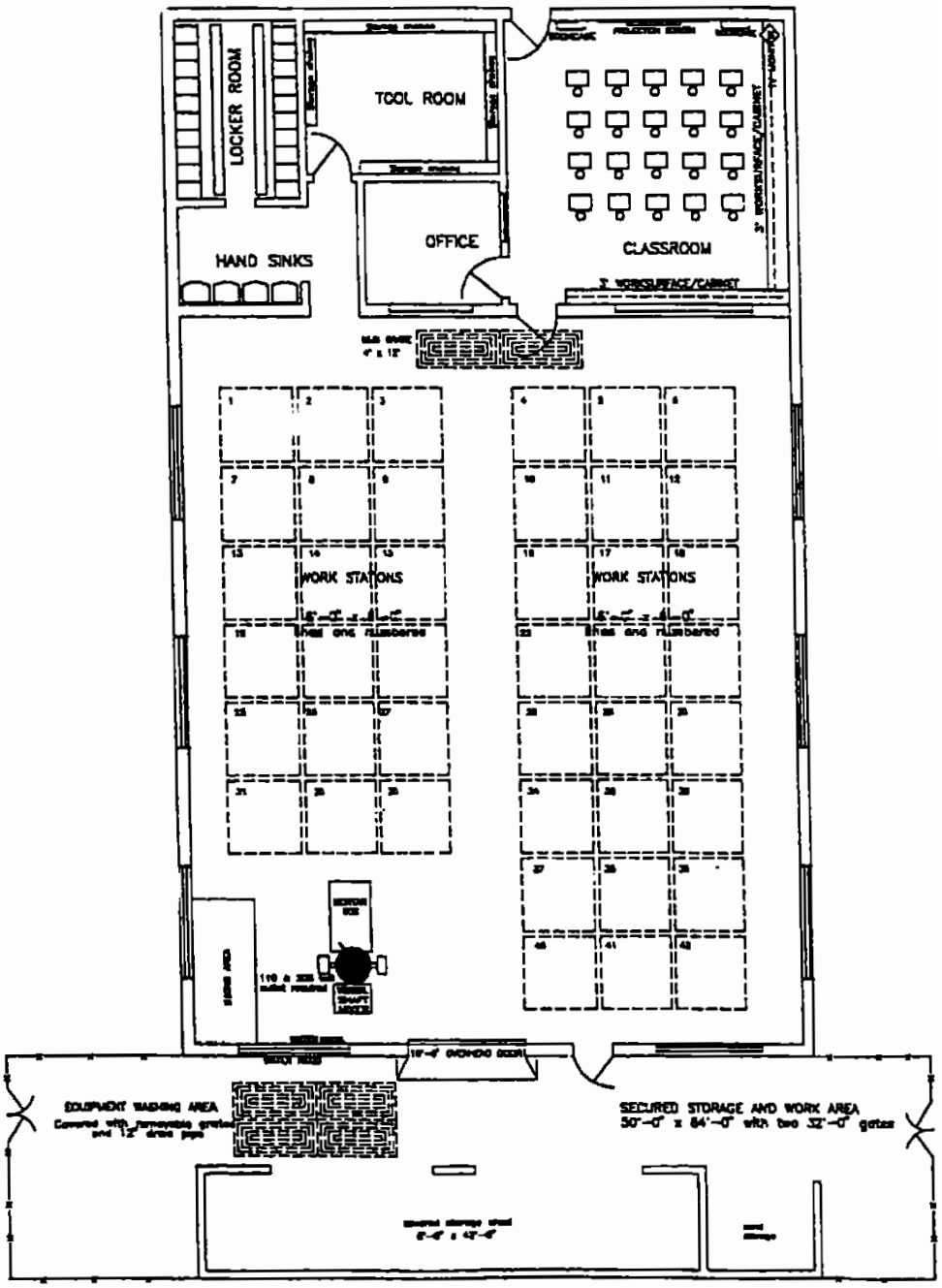
1. Typical Furniture:
   - A. Student tables and chairs in lieu of desks
   - B. Teacher desk and file cabinets
2. Typical Casework:
   - 36" base unit in classroom with storage beneath
3. Typical Equipment:
   - A. Basic masonry hand tools
   - B. Portable power tools
   - C. Masonry saw
   - D. Mortar mixer
   - F. Power trowel
   - G. Wheelbarrows
   - H. Mortar boxes
   - I. Scaffolding
   - J. Mortar pans

SPECIAL NOTES:

1. Perimeter receptacles (115V.); (208V. at mixer)
2. Water supply (cold) at mixing area
3. Cold water fountain
4. 24"x48"x6"deep pit with grate for cleaning shoes
5. Emergency disconnect switch for all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

Masonry



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PROGRAM AREA: Trade and Industrial Education

PROGRAM OR COURSE TITLE(S): Metals Manufacturing Technology

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To prepare for initial employment or further training in the metals industry.
2. Types of Instruction:
   Lecture; demonstration; hands-on laboratory experiences
3. Typical Activities:
   Independent laboratory practice at machines and work stations
4. Maximum Recommended Class Size: Level I: 20
   Levels II/III: 16
5. Typical Length of Class Period: 90 minutes (block schedule): All levels
   55 minutes (traditional): Level I
   110 minutes (traditional): Levels II/III
6. Typical Duration of Course: Semester (block schedule): Level I
   Year (block schedule): Levels II/III
   Year (traditional): All levels

RATIONALE FOR PROGRAM SELECTION:

Provides training for initial employment and further training in metals manufacturing technology and related occupations.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Should be in proximity to other trades programs. Requires ground-level exterior access.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   Electro-mechanical Technology
2. Other Elective:
   N.A.
3. Academic:
   N.A.

SPACE REQUIREMENTS:

1. Square Footage Range: 2,400-3,200 (exclusive of office)
2. Peculiar Needs:
   A. Capacity for loading/unloading equipment (hoist, fork lift, loading dock...)
   B. Large overhead door
   C. Adequate ventilation
   D. 208V. supply--three phase
   E. Emergency eyewash
   F. Hand wash, with hot and cold supply
   G. Compressed air supply

3. Special Conditions:
   A. Classroom area accessible to but separated from laboratory by windows to protect computer environment and provide visual access
   B. OSHA approved transparent welding curtains
4. Flexibility Needs:
   Flexible overhead electrical supply with drops to machines and equipment

FURNISHINGS AND EQUIPMENT:

1. Typical Furniture:
   A. Tables and chairs in lieu of student desks
   B. Three heavy-duty 48"x72" work benches with laminated wood tops--two with four bench vises each
   C. Teacher desk and file cabinets
   D. Teacher computer work station
2. Typical Casework:
   A. Large-capacity bookshelves
   B. Lockable storage cabinets
3. Typical Equipment:
   Heavy-duty floor model metal-working equipment

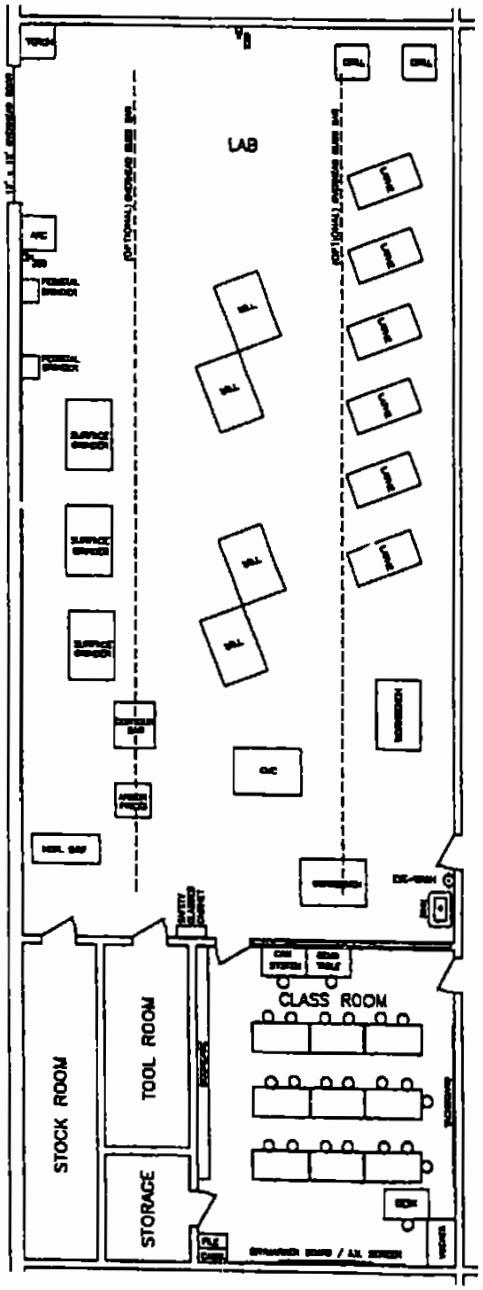
SPECIAL NOTES:

1. OSHA-approved flammable liquid storage cabinet
2. Retractable power cords above work benches
3. Separate secure tool storage
4. Adjustable shelves in all casework
5. Emergency disconnect switch for all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

EDRS

Metals Manufacturing Technology



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PROGRAM AREA: Trade and Industrial Education

PROGRAM OR COURSE TITLE(S): Textile Technology

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To prepare for careers or further study in textiles occupations
2. Types of Instruction:
   Lecture; demonstration; small-group cooperative learning; laboratory applications
3. Typical Activities:
   Class discussion; team activities conducted at work stations
4. Maximum Recommended Class Size: Level I: 20
   Levels II/III: 16
5. Typical Length of Class Period: 90 minutes (block schedule): All levels
   55 minutes (traditional): Levels I/III
   110 minutes (traditional): Level II
6. Typical Duration of Course: Semester (block schedule): Levels I/III
   Year (block schedule): Level II
   Year (traditional): All levels

RATIONALE FOR PROGRAM SELECTION:

Helps meet the need for a skilled workforce in the textile industry.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Machinery-oriented activities require consideration for noise.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   Drafting (computers and classroom)
   Graphic Communications (computers and classroom)
2. Other Elective:
   Art (computers and AVL loom)
3. Academic:
   Mathematics*
   Chemistry*
   Physics*
   English* *(computers and classroom)

SPACE REQUIREMENTS:

1. Square Footage Range: 2,000-3,000
2. Peculiar Needs:
   A. Compressed air
   B. Water supply (hot and cold)
   C. Overhead electrical service
   D. Storage room with shelves

3. Special Conditions:
   A. Excessive noise generated by equipment
   B. Air temperature and quality control
   C. access to student computers required
4. Flexibility Needs:
   Overhead door to exterior

FURNISHINGS AND EQUIPMENT:

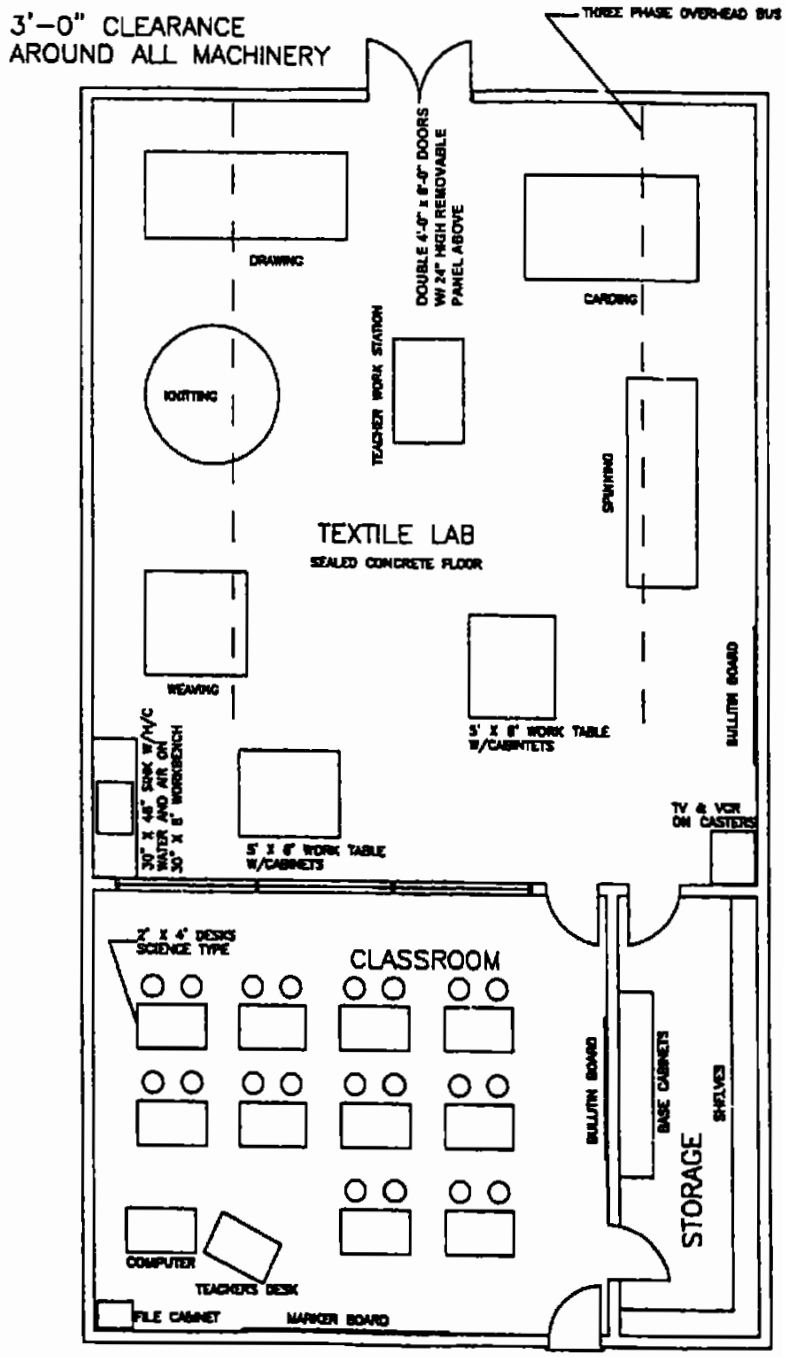
1. Typical Furniture:
   A. Two-student "science-type" tables with chairs, in lieu of student desks
   B. Teacher desk with file cabinets
   C, Teacher computer work table
2. Typical Casework:
   A. Base cabinet with chemical resistive top and storage drawers beneath
   B. Stainless work bench with deep sink and hot and cold supply
3. Typical Equipment:
   A. AVL loom and design work station
   B. Light box
   C. Refrigerator
   D. Knitting machines
   E. Quilling machine

SPECIAL NOTES:

1. Additional textile machinery may be required, as specified and donated by industry. Such donated equipment may have special electrical requirements.
2. Emergency disconnect switch for all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

Textile Technology



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PROGRAM AREA: Trade and Industrial Education

PROGRAM OR COURSE TITLE(S): Trade and Industrial Work Development

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To provide instruction and work-based experiences which assist students in developing career goals.
2. Types of Instruction:
   Lecture; demonstration; independent inquiry; teamwork
3. Typical Activities:
   VoCATS-related classroom activities; field trips; shadowing and internship experiences; cooperative learning experiences; apprenticeships
4. Maximum Recommended Class Size: 20
5. Typical Length of Class Period: 90 minutes (block schedule); 55 minutes (traditional)
6. Typical Duration of Course: Year (block schedule); Year (traditional)

RATIONALE FOR PROGRAM SELECTION:

Provides school-to-work transition experiences.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Should be located in proximity to other trade and industrial education programs.

SHARED SPACE OPTIONS:

N.A.

SPACE REQUIREMENTS:

1. Square Footage Range: 1,000-1,200
2. Peculiar Needs:
   Contiguous office/conference area for student consultations. Should provide visual access to classroom.
3. Special Conditions:
   N.A.
4. Flexibility Needs:
   Student furniture should be easily moved for frequent rearrangement.

FURNISHINGS AND EQUIPMENT:

1. Typical Furniture:
   A. Four-student tables with rolling chairs in lieu of student desks
   B. Demonstration table
   C. Teaching lectern
   D. Teacher desk and chair
   E. File cabinets
   F. Round conference table with chairs

2. Typical Casework:
    A. Computer counter for six computer stations
    B. Built-in shelving above computer stations
    C. Full-height adjustable shelving in storage room
3. Typical Equipment:
    A. Dry marker and tack boards
    B. Overhead-mount AV screen
    C. T.V./VCR
    D. Telephone (office)

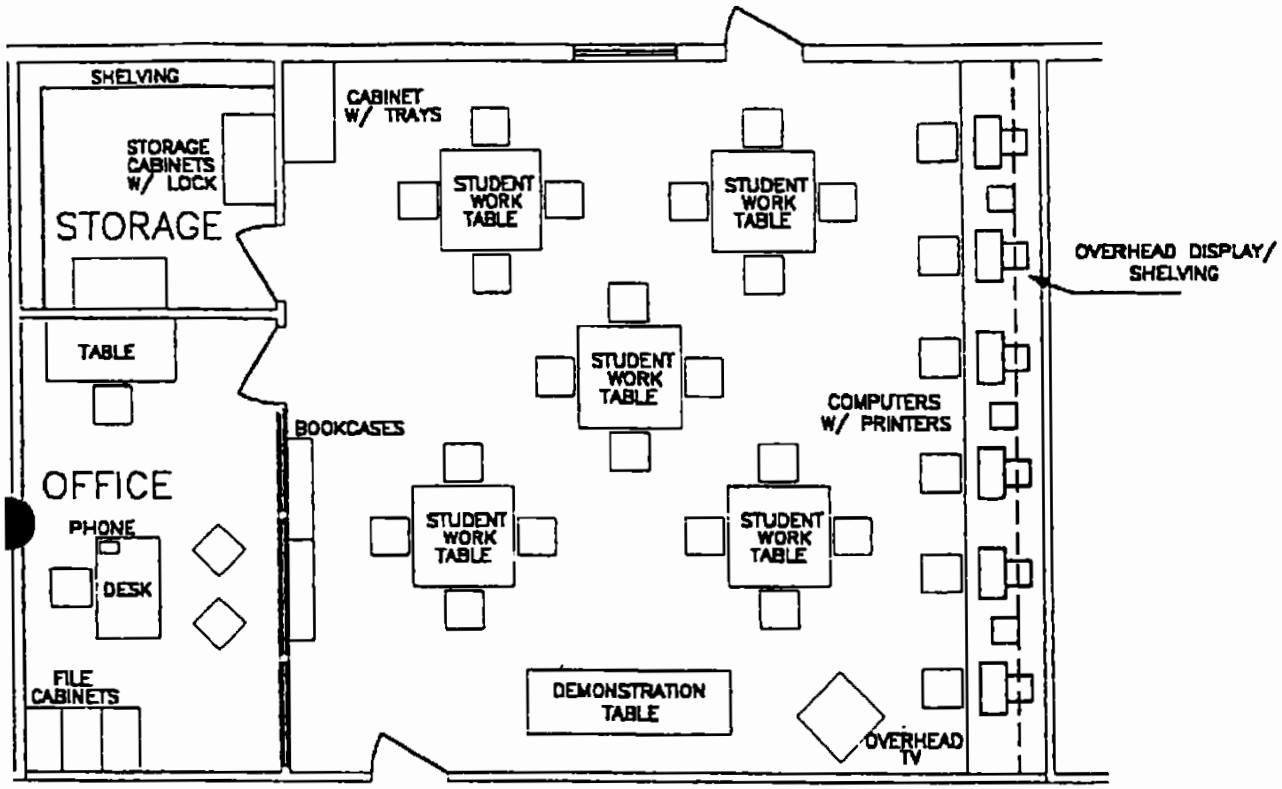
SPECIAL NOTES:

1. Much of available wall surface should have tack boards
2. Recessed floor receptacles as indicated

SAMPLE FLOOR PLAN: See next page.

EDRS

Trade and Industrial Work Development



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PROGRAM AREA: Trade and Industrial Education

PROGRAM OR COURSE TITLE(S): Welding Technology

PROGRAM OR COURSE DESCRIPTION:

1. Purpose:
   To develop skills in welding and related occupations leading to initial employment and further training
2. Types of Instruction:
   Lecture; demonstration; independent inquiry; small-group cooperative learning
3. Typical Activities:
   Classroom lectures, demonstrations, and group activities; hands-on laboratory applications
4. Maximum Recommended Class Size: Level I: 20
   Levels II/III: 16
5. Typical Length of Class Period: 90 minutes (block schedule): All levels
   55 minutes (traditional): Level I
   110 minutes (traditional): Levels II/III
6. Typical Duration of Course: Semester (block schedule): Level I
   Year (block schedule): Levels II/III
   Year (traditional): All levels

RATIONALE FOR PROGRAM SELECTION:

Prepares for initial employment and further training in metals manufacturing and related occupations.

PROGRAM LOCATIONS AND RELATIONSHIPS:

Should be located in proximity to other "shop" type programs and away from areas where noise can interfere with instruction.

SHARED SPACE OPTIONS:

1. Other Workforce Development:
   All "shop"-related programs requiring welding facilities
2. Other Elective:
   Art
3. Academic:
   N.A.

SPACE REQUIREMENTS:

1. Square Footage Range: 2,500 (excluding classroom)
2. Peculiar Needs:
   A. Fenced and covered outside work area
   B. Three concrete block enclosed grinding areas in outside work area
   C. Gas storage area with concrete block partitions located adjacent to building in outside storage area

D. Three computers in classroom
E. Locked tool room

3. Special Conditions:
   A Exhaust system for inside welding booths
   B. Smoke Eater-type air quality system
4. Flexibility Needs:
   Handicapped accessibility

FURNISHINGS AND EQUIPMENT:

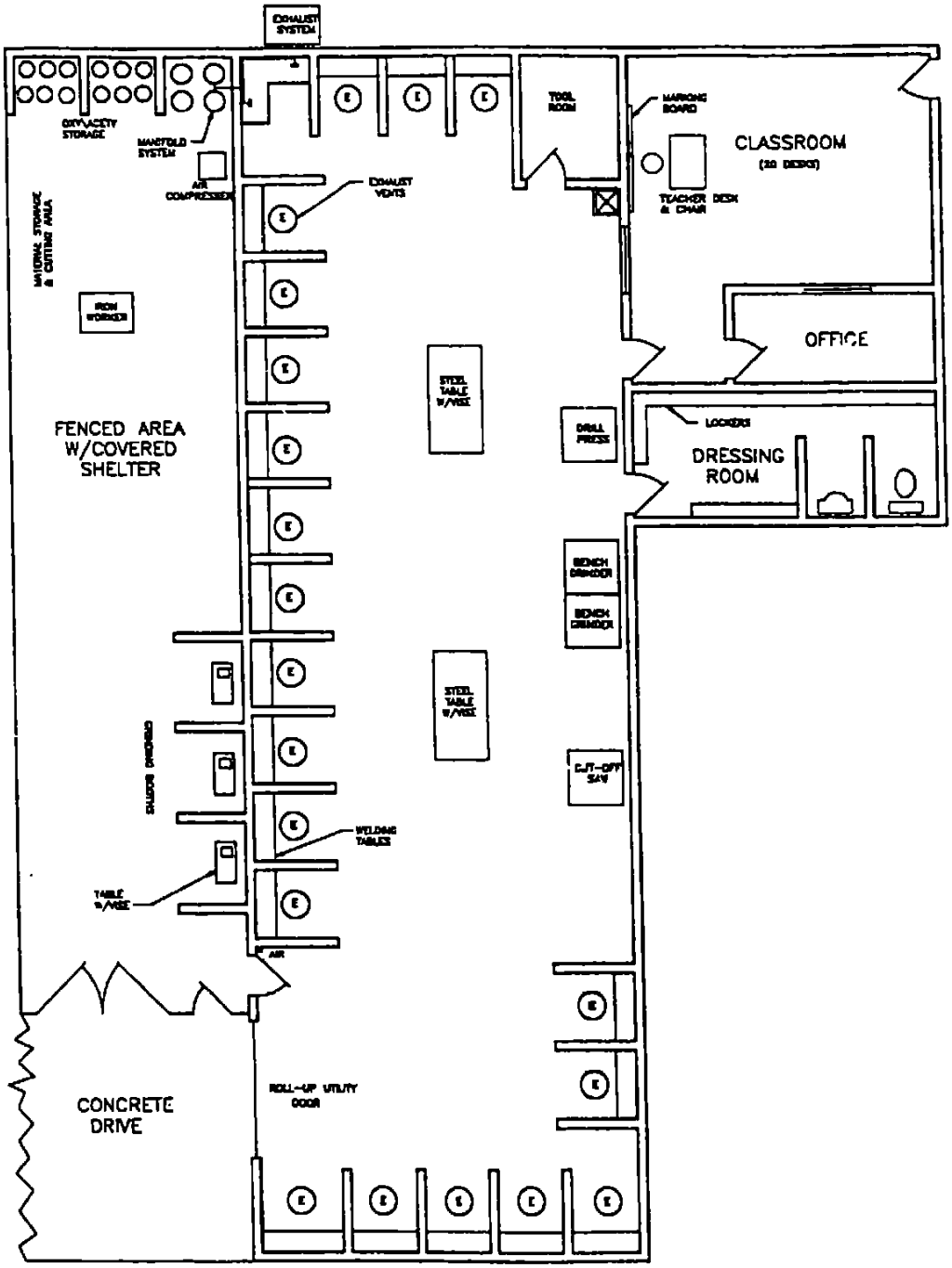
1. Typical Furniture:
   A. Teacher desk and file cabinets
   B. Student tables and chairs, in lieu of desks
   C. Steel-top work tables with machinist vises
2. Typical Casework:
   A. Teacher storage cabinets
   B. Storage cabinet for electrodes
   C. Flammable materials storage
3. Typical Equipment:
   A. Welding booths
   B. Metal-working tools and equipment

SPECIAL NOTES:

1. Perimeter electrical outlets, to include 240V. (or 208V.) service for welders
2. Overhead electrical supply drops in open floor area
3. Access to contiguous teacher workroom and office
4. Emergency disconnect switch for all equipment and outlets except lights

SAMPLE FLOOR PLAN: See next page.

Welding Technology



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ADDITIONAL RESOURCES

Workforce Development Education Programs of Study and Support Services, Workforce Development Education Section, N.C. Department of Public Instruction, 1997.

Vocational and Technical Education Equipment Standards, Workforce Development Education Section, N.C. Department of Public Instruction, 1993.

North Carolina Public Schools Facilities Guidelines, School Planning Section, N.C. Department of Public Instruction, 1997.

State Workforce Development Education Consulting Staff, N.C. Department of Public Instruction, (919)715-1620.

State School Planning Consulting Staff, N.C. Department of Public Instruction, (919)715-1990.

Local School System Directors of Workforce Development Education.