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AUTHOR Stanley, Rodney
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ABSTRACT

Technological developments make the world an ever changing place with the prospect of even faster change in the future. This document presents a course developed by the Kentucky State Department of Education that allows students to explore a number of technologies and their importance in this technological society. The document is separated into six sections. An introduction describes the purpose of the course, identifies the courses' eight basic goals, provides a course description, discusses the place of technology education in the education system, and enumerates teacher qualifications. The second section provides a description of the classroom organization that discusses curriculum presentation, module selection, classroom discipline, record keeping, grading, the teaching schedule, team teaching, and class management forms. The third section describes support groups that include the department of education, professional organizations, student organizations, and advisory committees. The fourth section provides descriptions of the 24 modules included in the curriculum. The fifth and sixth sections provide lists of materials, supplies, books, computer software, and audiovisual materials needed to complete each of the 24 modules. Vendors and prices are included for each item on the lists. Two appendices provide suggested classroom management forms, a list of supplementary materials, and possible classroom floor plans. (MDH)

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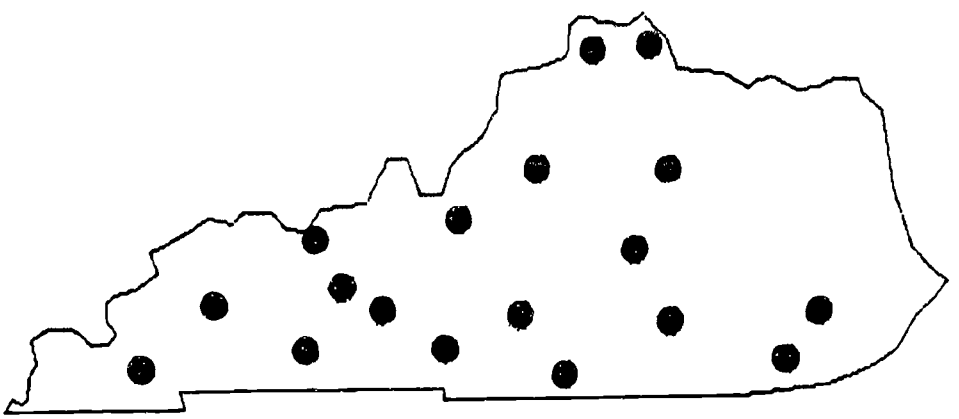
TECHNOLOGY EDUCATION *IN THE 21st CENTURY*



Industrial/Technology Education Unit
Office of Secondary Vocational Education
Kentucky Department of Education
Frankfort, Kentucky

2/92

TECHNOLOGY EDUCATION *IN THE 21st CENTURY*

Industrial/Technology Education Unit
Kentucky Department of Education
Frankfort, Kentucky

Rodney Stanley
Morehead State University
Morehead, Kentucky

1991

The mention of software programs, hardware, videotapes, books and equipment are only representative examples, not an endorsement.

All worksheets and activities contained in the modules are examples of what may be used in the program. These are only examples you are encouraged to use your own.

Level I CAD uses AutoCAD to do the drawings, AutoSketch may be subsituted for AutoCAD.

TECHNOLOGY EDUCATION
IN THE 21st CENTURY

INTRODUCTION

The world is an ever changing place. Advances in technology over the last generation have been phenomenal and the future is expected to hold an even faster rate of technological change. It is likely that the technologies that will be common place in the next generation have not been developed. This program will assist the student in gaining a better understanding of important technologies that are currently being used. Furthermore, this course will allow the student to cope with an ever changing world. By providing a technical knowledge base the student can analyze changes in technology and understand how the changes will affect his/her life.

This course will allow students to explore a number of technologies that are, or will be of importance in a modern technological society. The course will include self-directed study modules lasting a period of two or four weeks per module. The number of modules covered depends on the student's grade level and length of time in the course. Instruction will include the use of reading materials, videotapes, filmstrips, computer programs, and hands-on activities. The course instructor will manage the course and provide guidance and individual instruction to the students as needed.

If the student of today is to become a leader and thinker of tomorrow a good understanding of technology is important. This Modular Technology Education program will introduce technology to the student to develop a knowledge base about technology, develop critical thinking skills, and prepare the student to accept and understand new technologies.

It is important to remember there will be students in the class that have disabilities and handicaps requiring changes in the curriculum. Sometimes this might result in a decrease in the number of activities required for the completion of a module. In other cases this may require alternative activities. (One of the rockets listed in the Aerospace equipment list is designed for students with reduced manual skill levels.) Identifying exact changes in equipment, materials, and curriculum is impossible. Changes must adapt to the special requirements of each special needs student. Evaluating each student on an individual basis will determine what you can reasonably expect from the student in the way of activities and progress. Instructors should ask the student, counselors, and parents to help design activities based on the student's individual needs and abilities.

GOALS

The goals of this course include but are not limited to:

- Introducing the student to applications of current technologies.
- Informing the student about how technology affects society.
- Developing skills necessary to analyze the effects of technological change.
- Developing skills necessary for self-directed learning.
- Developing skills in problem solving.
- Providing students with handicaps and disabilities positive experiences to improve self-esteem and self-confidence.
- Eliminating sex bias by providing both female and male students with activities that can be completed on an equal basis.
- Assisting the student in future educational and career decisions.

COURSE DESCRIPTION

The Technology Education course consists of individual topic modules. Two students at a time will study a module. The topic covered by each module will use self directed study materials and will include the use of computer software, videotapes, filmstrips, textbooks, and hands on activities. After the students have studied the module for the amount of time allowed, each student will move on to another chosen module.

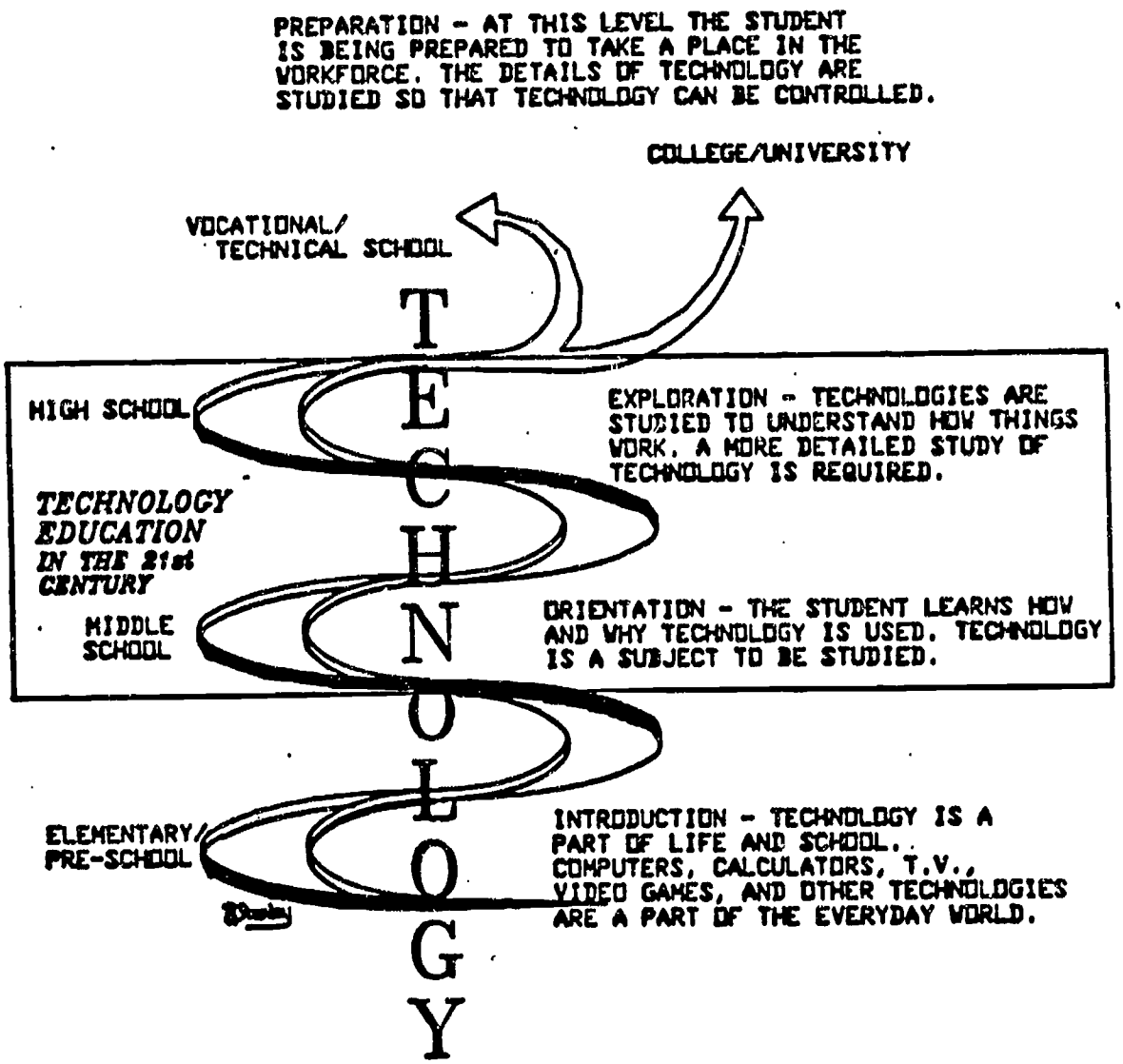
The Technology Education is an orientation course in Level I programs and an exploration course in Level II programs. Level I programs will have students at each module for two weeks. Level II programs will allow four weeks at each module. Many of the activities for Level I and Level II programs are the same. However, the extra time allowed in Level II programs will give the student a deeper understanding of the topic.

The Technology Education course will integrate academic subjects into the modules. The student will find applications of academics in the technology modules and find examples of technology in academic subjects. This ability to recognize the influence of technology will help the student to understand how technology affects his/her environment.

TECHNOLOGY EDUCATION'S PLACE IN THE EDUCATION SYSTEM

With more emphasis being placed on technology in the schools the Technology Education courses will become more important in the overall educational program. It is becoming a necessity that students have a working knowledge of technology and how technological change will affect their future. The use of technology will begin in the early elementary grades. In middle school technology becomes a topic of study. The student learns how and why technology is used. The high school student begins a more detailed study of technology to discover how things work. Post high school programs teach the details of technology to prepare the student to use technology in the work place. Technology becomes something that can be used and controlled. The diagram on the following page illustrates how technology fits into the overall educational experience of students. The Technology Education program is part of the orientation and exploration stages of the process.

PATHWAY OF TECHNOLOGY EDUCATION



TEACHER QUALIFICATIONS

The qualifications a teacher must have for the Technology Education program are basically the same as required for current Industrial Arts courses. The teacher needs to have a basic understanding of a number of technological areas and have current certification to teach in Level I and/or Level II programs. In addition the teacher should have a working knowledge of computers and computer applications programs. Teachers with a certification in math and science, especially physics, might also qualify if the teacher has had course work in areas of technology.

Currently there are no teacher education programs that specifically prepare instructors for this modular type of technology education program. Teacher education programs currently in place usually require teachers to take courses in a number of technological areas. Therefore, the transition will require activities that provide an understanding of the modular concept and the management requirements to carry out a modular based program.

CLASSROOM ORGANIZATION

CURRICULUM PRESENTATION

The modules will present instructional material to the student through a variety of methods. The modules will use readings, videotape, filmstrips, computer assisted instruction, hands-on activities, and individualized attention from the instructor.

Student activity guides will provide instructions about the activities the student should complete in order to progress through the module. Instructional methods will include reading assignments, video tapes, filmstrips, computer programs, and hands on activities.

Much of the instructional equipment on the equipment list was selected because it is part of a training package that contained curriculum materials in printed or computer format. In other cases, instructional activities were developed for the technology education program from existing instructional models. The instructor should feel free to develop and expand activities for the modules as materials and resources become available.

MODULE SELECTION

Each student will select the modules that he/she would like to study. The number of modules selected will depend on the level and length of time the student will be in the program. The process of assigning students to modules should result in each student being able to study as many modules of his/her choice as possible. The student will work with a new partner at each module.

The level I student will be in the technology education program for nine, twelve, or eighteen weeks. This will result in the student studying four, five, or seven modules respectively for a two weeks at a time. The level II student will be in the technology education program for one or two semesters. The one semester student will study four modules while the one year student will study seven modules. Level II student will be in each module selected for a period of four weeks.

Each student will select modules by ranking the available modules in order of preference. The instructor should then place students in modules by randomly selecting a student and placing that student in the module that is ranked first. Randomly select another student and place him/her in the module the student has ranked first. This should continue until each student has been placed in one module. If you cannot place the student in the first choice module the student is placed in the module selected

as the second choice. After each student was been selected for one module repeat the process for the second choice, then the third, etc. until each student is placed in the appropriate number of modules.

CLASSROOM DISCIPLINE

The modular concept being used in this program requires that students work on their own. Students should not disrupt other students or misuse the instructional materials and equipment available. Each student is given a "discipline sheet" with three discipline action report areas. The appropriate area is completed whenever an infraction of classroom rules occurs. The instructor will have a conference with the student after the first incident. If a second incident occurs, the student's parents will be notified. A student that has three disciplinary actions taken will loses all privileges in the Technology Lab.

It will be up to the instructor to decide what behavior will result in a discipline action. It is important that the rules established are based on reasonable expectations and are fair and impartial in their enforcement. In general, rules should address safety, need for individual work on modules, care of equipment, and other requirements established by school policy.

RECORD KEEPING

With the modular program each student is responsible for maintaining records on attendance and progress. These records are kept using a computer based system or a traditional paper recorded system. In either case the instructor should check the record files daily and maintain a duplicate backup copy.

A major part of the modular concept is the students self development. Learning how to learn and maintaining records to document the learning is important to this self development. The instructor is ultimately responsible for the classroom records but the student should not depended on the instructor to keep the progress records. Keep a backup copy of the records kept by the student.

Regardless of how you keep records, the records of an individual student must not be available to any other student. Students should not browse through the records to see how classmates are doing on exams or other progress data. This is no different from precautions taken with a traditional grade book system to insure the confidentiality of student records.

GRADING

You can handle the method of assigning grades to each

student for periodic reporting in many ways. Grades can be determined by overall averages based on test and exam scores. Grades can be based on the number of units completed in each module. Attendance can be used in determining part of a students grade. Or, a method that combines some or all of these and other factors might be developed. It is important that whatever grading system is used it is fair and does not discriminate among students based on factors that are beyond the students control.

When developing a grading system the instructor should keep a number of factors in mind:

* Not all students will be working on or completing the same modules.
* Students with handicaps and disabilities might be doing different assignments than other students.
* Outside factors that are beyond the control of the student could affect the amount and quality of work.
* Students will be working in pairs where one student might holdback another student reducing overall progress.
* Instructional materials and equipment might not be available to the student when needed. e.g. all of the VCR's and TV's might be in use.

TEACHING SCHEDULE

The teaching schedule for a Technology Education program

will be different based on a number of factors. Size of the school, combination of Level I and Level II programs, integration of traditional industrial arts courses, and other factors will influence a teachers daily schedule. The following examples illustrate the different scheduling possibilities available to the teacher.

EXAMPLE 1: Level I and Level II programs using the same lab.

Period	Class
1	Level I class one.
2	Level II class one.
3	Preparation period.
4	Special problems period.
5	Level I class two.
6	Communications.

EXAMPLE 2: Single level program only with traditional courses.

Period	Class
1	Technical Education class one.
2	Preparation period.
3	Communications.
4	Technical Education class two.
5	Technical Education class three.
6	Special problems.

EXAMPLE 3: Level I and Level II program with traditional courses. Seven period day.

Period	Class
1	Special Problems.
2	Level I Technical Education.
3	Communications.
4	Level II Technical Education.
5	Production.
6	Preparation period.
7	Special Problems

Many other schedules are possible and the exact schedule developed will depend on the specific situation found at the

school. The availability of a special problems class is strongly encouraged. A special problems class will allow the student that has a strong interest in a particular technology to expand his/her learning opportunities.

TEAM TEACHING WITH ACADEMIC TEACHERS

Another factor that will affect the use of the Technology Lab is a team teaching approach using teachers from the academic subject areas. The Technology Lab can become a resource center for the academic teachers to give "real life" examples. The lab can support the study of mathematics, science, history, writing, and other subject areas. The academic teacher can assist the technology teacher to help the students see how the traditional and sometimes less popular subjects are necessary for a thorough understanding of technology.

FORMS

At the end of this document are forms designed to make managing the class a little easier. You can use these forms or you can design of your own if you have a better idea. It is likely you will need to modify the forms to adapt them to your schools schedules. What's important is that you can keep your classes organized.

Some of the forms you will find are for student use and others are for the instructor. As mentioned in the section on

classroom organization, the instructor should keep duplicate records of any form the student is responsible for. Also remember that some of these records could be keep on a computer as well as on hard copy forms.

Forms in APPENDIX A:

Student Sign-up Sheet

Module Rotation Setup Sheet

Module Rotation Schedule

Student Record Sheet

Discipline Action Sheet

SUPPORT GROUPS

DEPARTMENT OF EDUCATION

The Kentucky Department of Education is the major support group for the Technology Education program. By providing workshops and other retraining opportunities for the classroom teachers the Department of Education will make the transition from Industrial Arts to Technology Education much easier. This retraining will use the materials and equipment that will be used in the classroom.

Consultants are available in the Department to answer questions you may have regarding the implementation of the Technology Education program. The consultants can also put you in contact with factory representatives and other teachers that can answer questions about specific modules.

PROFESSIONAL ORGANIZATIONS

There are many organizations for the teacher that can provide support and information. These organizations provide journals, newsletters, and conference opportunities that give the classroom teacher ideas for improving his/her class. The journals contain articles about techniques and procedures written

by teachers in similar situations. Information about upcoming activities such as meetings and organization sponsored workshops is found in newsletters. Conferences give the teacher a place to meet and talk to other teachers, attending workshops, and hear first hand reports about what works and what doesn't.

Some of the organizations that can help the teacher in technology education are:

American Vocational Association

Kentucky Vocational Association

International Technology Education Association

Kentucky Industrial Education Association

STUDENT ORGANIZATIONS

The Technology Student Association is the principle organization for students in technology education. TSA is a student run organization that helps develop skills that are hard to learn in a classroom. Through meetings, activities, and competitive events students in TSA develop their personal and technical skills.

Kentucky's Technology Student Association is very active on the state and national level. Seven KTSA chapters were winners at the 1991 National Conference held in Tulsa, Oklahoma. Students across the state are looking forward to the 1992 conference to be held in Richmond, Virginia. The 1991-92 president of KTSA is Melany Crawford of Bath County High School.

ADVISORY COMMITTEES

Local advisory committees can give the teacher a tremendous amount of help. Representatives of business and industry can provide "real world" examples of how technology is used. Advice from the committee on activities, equipment, and curriculum materials greatly improves the program. Having committee members judge contests and student projects help the student understand the quality of work expected by employers.

Students taking special problems classes will benefit from the guidance provided by committee members that have a stronger background than the classroom teacher in specific areas. In cases where committee members can't provide this help they may be able to contact others willing to contribute to the program.

A final note on advisory committees. If an advisory committee is established, and it should be, do not ignore the advice of the committee. The members will be taking time away from busy schedules to help your program and the advice given should be strongly considered. Granted, you will not be able to carry out all of the suggestions due to budget, time, or school policy. When suggestions cannot be used inform the committee of the problem and let them know that the input given was appreciated.

MODULE DESCRIPTIONS

Aerospace

The past, present, and future of air and space flight are introduced to the student through this module. The student will use video tapes, books, computer programs and activities of building a plane and or rocket. The level I student will use prepared kits to build the flying craft. The level II student will build the flying craft using basic materials.

Alternate Energy Systems

Fossil fuels have been used to satisfy our energy needs for many generations. Problems with supply and pollution have resulted in the need to explore energy alternatives. The Alternate Energy Systems module is designed to introduce the student to energy sources that can be used to replace fossil fuels.

Applied Physics

The student studying this module will discover the uses and principles of basic mechanisms, hydraulics and pneumatics. Physical principles of leverage, gear ratios, pressure in cylinders are some of the topics that will be covered.

Audio-Video

The Audio-Video module will involve the student in the technology of audio-video production. The level I student will produce an audio tape using a variety of input choices. Level II will have the student producing an audio tape and a videotape using cameras and editors much like the equipment used to produce the videotapes viewed in these modules.

Biotechnology

Biotechnology is a rapidly growing industry, it is the merging of several technology's into one. It uses principals of the medical field and the agricultural industry. In this module the students will be studying hydroponics, genetic engineering, DNA, and fermentation.

Careers

Career choices are not easy for anyone to make, especially young adults. This module will provide some explorations into different career areas so that they can start making some decisions.

Computer Aided Drafting

Technological advances start with in idea put into a drawing for others to understand. This module takes the student through the basic concepts of drafting and leads the student to the computer technology know as CAD. Students will have the opportunity to advance to a level that uses AutoSketch or AutoCAD.

Computer Graphics

Computer generated graphics are used today in TV, movies, newspapers, technical publications and many other areas. This module will allow the student to create graphics on the computer with graphics programs, and BASIC programing. The student will be able to combine the graphics into an animated computer display.

Computer Numerical Control/ Computer Assisted Manufacturing

Modern manufacturing relies on the technology of CNC/CAM systems. The student working on this module will discover the technology that allows a computer to control the operation of machine tools. This technology is a basic requirement of robotic manufacturing systems and automated industries. Level I will introduce basic milling operations and will result in the student programming a milling system to engrave nameplates, or plaques. The level II student

will produce a machine part by programming the milling system to make cuts in three dimensions.

Desktop Publishing

The printed word is still one of the best ways to communicate. The technology introduced in this module allows the student to apply computer technology in the production of printed materials. Desktop publishing systems are used in the publishing of cards, books, newspapers, advertising flyers, and other items where the best way to spread a message is with ink and paper.

Electricity/Electronics

The electricity/electronics module will allow the student to explore basic theories and applications of electronic circuits. Electricity is the most versatile form of energy that is available to technological world. Electronics uses this energy source for computers and other "high technology" applications. This module directs the student in the construction, testing, and analyzing of basic electronic circuits.

Engineering Structures

The building and testing of model bridges introduces the student to the world of civil engineering. This module provides the student with the opportunity to test a bridge the student has designed and built. The student may select a standard engineering design or experiment with a design that is developed from the student's own ideas and imagination. Students will also construct a geodesic dome structure.

Environmental Impacts

The environment is rapidly changing, and in some cases something must be done to preserve it. This module will introduce the student to global warming it's causes and affects. The student will also study pollution, recycling, waste reduction and ozone layer depletion.

Home Maintenance

The need to understand and repair the personal home is becoming a necessity for many people. In this module the student will explore the technologies at work in the home. The student will learn maintenance and repair methods that can save a home owner many dollars. The plumbing, electrical, and structural systems in the home will be covered in this module.

Laser/Fiber Optic Technology

This module will allow the student to use Helium-Neon lasers to explore the basic principles, and applications of lasers. Some of the experiments use fiber optic cable to acquaint the student with the cable's ability to transmit the laser light. Level II students will be able to further explore fiber optic technology with the fiber optic course materials.

Mass Production

In this module the student will study techniques developed by Henry Ford. Ford's idea for mass production has to be ranked as one of the most significant advances ever made in the manufacturing industry. Mass production techniques remain the corner stone of modern manufacturing processes.

Photography

Photography is a technology that is over 150 years old. Today the use of photography is vital to research work, manufacturing of integrated circuits, and other areas of technology. This is in addition to the traditional uses of recording daily events for news publications and family memories. The level I and level II student will construct and use a pinhole camera to learn the basic principles of photography. The student will develop photographs and make a photogram while learning basic darkroom techniques. The level II student will go on to using a single-lens-reflex camera to further explore photographic techniques.

Plastics

Plastics play a major role in today's society, from the automobiles we drive to the containers for our food. There are many different types of plastics and there are several ways plastics can be formed. The student will study injection molding, vacuum forming, fiberglass application, resin cast and polystyrene expansion.

Problem Solving

This module will allow the student to use different approaches in problem solving. The student will also use the module to discover alternative solutions and how to use problem solving to make decisions on various problems.

Production

This module will instruct the student in basic woodworking and plastics technology. The level I student will produce a letter holder using wood and acrylic plastic. The level II student will produce a CD holder using the same materials. Safety is emphasized in this module. Safety glasses will be required any time the student is working with power tools. Visitors (instructor) should also have safety glasses when power tools are in use.

Programmable Controllers

This module is directed toward the power and control applications of electricity. It is designed for Level II students only. The student studying this module will use a programmable controller to turn electrical devices on and off in the proper sequence.

Research and Design

The Research and Design module will allow the level I student to use critical thinking and creative design to produce a magnetic levitation vehicle. The student will design and manufacture a MagLev Racer. The MagLev Racer is a vehicle that floats on a magnetic field. The level II student will design, produce and race a CO_2 powered dragster. These vehicles will be tested and raced to see if

the student's research and design efforts are sound. [SAFETY NOTE: INSTRUCTORS MUST DISABLE THE CO_2 RACER BY PERMANENTLY FILLING THE CARTRIDGE HOLE WITH A DOWEL OR SPENT CO_2 CARTRIDGE BEFORE THE STUDENT CAN BE ALLOWED TO TAKE THE RACER HOME.]

Robotics

The use of robots is the biggest advancement in the manufacturing industries since Henry Ford developed the concept of the assembly line. Robot technology has been a benefit by allowing a machine to replace humans in jobs that are dangerous or monotonous. However, in replacing humans in some jobs many more jobs have been developed for people to design and maintain the robotic systems. This module will introduce the student to the basics of robot design, control, and applications.

Transportation

The transportation of people, goods, materials, and supplies is an area of major importance. The internal combustion engine that runs on fossil fuel is becoming an endangered species in many large cities. The need for non-polluting transportation systems to move people and materials from place to place is becoming a necessity. This module allows the student to explore present and future transportation methods.

Modules Under Development

COMPUTER INTEGRATED MANUFACTURING
ELECTRICAL SYSTEMS
MEDIA TECHNOLOGY
TEAM PROBLEM SOLVING

EQUIPMENT & SUPPLIES

The following list of materials and supplies contains items selected to allow completion of the specified module. The list of equipment is based on curriculum requirements and staff training opportunities. If substitute items are selected take care to be sure that the items will be compatible with the curriculum requirements. Selection of substitutes may make it difficult to take advantage of State sponsored training and curriculum. However, you may add items you think will significantly improve the quality of the modules or that will allow the advanced or Special Problems student to acquire a more challenging learning experience.

Package quantities are shown in ( ).
Square brackets [ ] are used to show suggested quantities for best price.

(PRICES SHOWN HAVE BEEN ROUNDED UP TO NEAREST DOLLAR)

COMMON USE ITEMS

1	Video Player	I,II	$ 180
2	TV, 13" Color	I,II	$ 230
3	Film Strip Projector w/Sound	I,II	$ 80
4	Copier - Xerox 5008	I,II	$ 730

[AT LEAST TWO EACH OF ITEMS 1 & 2 IS RECOMMENDED]

General Safety Equipment

	ITEM	LEVEL	PRICE
1	Safety Goggles (Fit over glasses)	I,II	$ 5
2	First-Aid Kit - Small	I,II	$ 25
3	Eye Wash Station	I,II	$ 20

Cost for 20 students, level I or II $ 145

COMPUTER SYSTEMS

At least one of each of the following computer systems should be available for classroom use as common equipment to be used when needed. If individual module stations are not going to be supplied with computers as indicated in the equipment list, additional computer systems will be needed for common use.

TYPE 1	286 CPU (IBM compatible)	$2961
	1MB Memory	
	1-1.44MB (3.5") Disk Drive	
	30MB Fixed Disk	
	Serial/Parallel Adapter	
	Display Adapter	
	Mouse Port	
	286SX Processor (10MHz)	
	80287-10MHz Math Coprocessor	
	Dual Async Adapter/A	
	Mouse	
	System 2 14" Color Display	
	MS DOS 3.3 (3.5"&5.25")	
Type 2	Laser Turbo XT (IBM compatible)	$ 900
	640K RAM	
	360K Disk Drive, 5 1/4"	
	40MB Hard Drive	
	MS DOS 3.3 w/ GW Basic	
	Magnavox High-Res. Green Monitor	$ 110

Type 3	386 CPU (IBM compatible) 2MB Memory 1-1.44MB (3.5") Disk Drive 60MB Fixed Disk Serial/Parallel Adapter Display Adapter Mouse Port 386SX Processor (16MHz) 80387SX-16MHz Math Coprocessor Dual Async Adapter/A Mouse System 2 14" Color Display MS DOS 3.3 (3.5"&5.25")	$3688

MODULE MATERIALS AND EQUIPMENT

Aerospace

	ITEM	LEVEL	PRICE
1	Electronic Beam Launcher	I,II	$ 15
2	Porta-Pad (Launch pad)	I,II	$ 12
3	Altitude Finder	I,II	$ 11
4	Fin Aligner	I,II	$ 12
5	Igniters (6/PK) [10]	I,II	$ 15
6	Rocket Kit - Gnome [10]	I,II	$ 27
7	Rocket Engines - A8-3 (3/pk)	I,II	$ 4
8	Rocket Engines - 1/2A3-4T (4/pk)	I,II	$ 4
9	Rocket Kit - Alpha [10]	I	$ 45
10	Airplane Kit - DELTA DART (35/PK)	II	$ 35
11	Body Tubes (BT-20) [10]	II	$ 15
12	Dowel Rod, 1"x12" [10]	II	$ 4
13	Gummed Tape, 3"x600' (color- W,B.Y,or R)	II	$ 6
14	Nose Cone Cork, 8xx, (30/pk) [10]	II	$ 18
15	Nose Cone Cork, 12xx, (30/pk) [10]	II	$ 26
16	Shroud Lines (400 yds)	II	$ 3
17	Engine Block (3/PK)	II	$ 2
18	Engine Locks (10/PK)	II	$ 2
19	Screw Eyes, 3/4" (100/PK)	II	$ 5
20	Launch Lugs, 8" (10/PK)	II	$ 3
21	Fin Material, CARDBOARD, 8.5x11 (10/PK) [10]	II	$ 5
22	Shock Cord (4/PK) [10]	II	$ 8
23	Chute Paks, 12" [10]	II	$ 18
24	Balsa Material, 1/8"x1/8"x24" (50/pk)	II	$ 10
25	Hot Plate	II	$ 41
26	Wind Tunnel	II	$
27	Tissue Paper	II	$
28	Masking Tape 1"	II	$
29	Poster Board	II	$

Optional Items

30	Airline Pilot - CHOICE model 471	I,II	$2424

	includes computer		
31	Aerospace Engineering - CHOICE model 473p Wind Tunnel	I,II	$2093
	Cost for 20 students.	I	$ 233
	Cost for 20 students.	II	$ 323
	Cost for 20 students each level.	I,II	$ 500

Alternate Energy Systems

	ITEM	LEVEL	PRICE
	Optional Items		
1	Solar Cell - Unilab (011.114)	I,II	$ 69
2	Miniature Geared Motor - Unilab (011.117)	I,II	$ 128
3	Hydro Electric Generator 10-771	II	$2650
4	Wind Power Generator	I,II	$ 199
5	Solar Cell Panel Kit	I,II	$ 79
6	Solar Powered Stirling Engine	I,II	$ 550
7	Solar Hot Water Collector	I,II	$ 550
8	Complete Alternate Energy Technology complete including workstation, 3-8 above listed components, booklets, transparencies, audio-visuals, and courseware.	I,II	$5950
9	Emissions of Alternate Fuel		

Applied Physics

	ITEM	LEVEL	PRICE
1	Pneumatics Trainer	I,II	+$1000
2	Mechanisms Trainer	I,II	$1000
3	Manuals (extra) ($30ea)		$ 60
	Total	I,II	$2150
	Optional Items		
4	Hydraulics Trainer	I,II	$1000
5	Fluid Power Applications (use with D1000)	I,II	$ 729
6	Manual	I,II	$ 30

Audio-Video

	ITEM	LEVEL	
1	Compact Disk Player - LXI	I,II	$ 125
2	Mixer - 5 Channel, 3 Mike	I,II	$ 120
3	Microphone - Unidirectional	I,II	$ 18

4	Desk Mike Stand	I,II	$ 7
5	Gooseneck Extension	I,II	$ 6
6	Cassette Deck - Dual w/ Dubbing	I,II	$ 150
7	Cassette Playback Deck	I,II	$ 50
8	Amplifier	I,II	$ 60
9	Turntable - Semi-Automatic, Belt Drive	I,II	$ 90
10	Speakers (2) - Compact, 2-way ($35 ea)	I,II	$ 70
11	Power Strip - 6 outlet	I,II	$ 22
12	Camcorder - RCA CC286 w/Kit - light, case, adapters,and rechargeable battery.	I,II	$ 950
13	Tripod	II	$ 100
14	Video Editor - Videonics' DirectEd PLUS	II	$ 550
15	VCR	II	$ 220
16	Video Player	II	$ 180
17	TV, 13" Color	II	$ 230
18	Blank Video Tapes	II	$
19	Blank Audio Tapes	I,II	$
20	Headphones	I,II	$

Optional Items

21	Radio Programmer - CHOICE model 413	I,II	$2794
	Total	I	$1668
		I,II	$3038

<u>Biotechnology</u>

	ITEM	LEVEL	
1	Greenhouse	I,II	$ 55
2	Plant Food	I,II	$ 5
3	Moisture & Light Meter	I,II	$ 26
4	Cheese Production BioKit	II	$ 52
5	DNA Simulation Student Kit	II	$ 18
6	Biotechnology Kit:DNA Extraction	II	$ 55
7	Shallow Water Bath	II	$ 103
8	Fish Bowl	I,II	$
9	Top Soil	I,II	$
10	Seeds	I,II	$
11	Exercise Mat	I,II	$
	Total	I	$ 86
		I,II	$ 314

<u>Careers</u>

ITEM

No dedicated equipment

Computer Aided Drafting

	ITEM	LEVEL	PRICE
1	Computer - Type 1	I,II	$2961
2	Drafting Board - Ames Draft-Pak	I,II	$ 62
3	Drafting Kit - Teledyne Post 13 piece	I,II	$ 28
4	Printer - Panasonic 1624	I	$ 469
5	Plotter - Houston Instrument PC-695	II	$ 690
6	Drafting Paper, 11"x14"	I,II	
	Optional Items		
7	A/B size plotter ENCAD SP-600	I	$ 640
8	A/D size plotter Houston instruments DMP-61	I,II	$3200
9	A/D size plotter - 8 pen ENCAD SP-1800	I,II	$2795
10	Kurta XLP Digitizer with 4 button cursor & pen, 12 X 12	I,II	$ 325
11	Printer - 80 column, 24 pin dot matrix NEC P3200	I,II	$ 395
	Total	I	$3520
		II	$3741
		I,II	$4210

Computer Graphics

	ITEM	LEVEL	PRICE
1	Computer - Type 1	I,II	$2961
2	Printer - Star NX-1000 Rainbow (7-color)	I,II	$ 225
	Optional Items		
3	Plotter - ROLAND - 8 pen (sketchmate)	I,II	$ 710
4	Scanner/Cutter - Stika	I,II	$1005
	Total	I,II	$3176

Computer Numerical Control/Computer Assisted Manufacturing

	ITEM	LEVEL	PRICE
1	Computer - Type 2	I,II	$1010
2	CNC Mill	I,II	$3745
3	Milling Machinist Kit	I,II	$ 390
	Optional Items		

4	CNC Lathe	I,II	$3557
5	Turning Machinist Kit	I,II	$ 375
	Total	I,II	$5145

Desktop Publishing

	ITEM	LEVEL	PRICE
1	Computer - Type 1	I,II	$2961
2	Scanner - DFI Handy Scanner 3000 Plus	I,II	$ 179
3	Printer - Panasonic 1624	I	$ 469
	or		
4	Printer - Star NX-1000 Rainbow (7-color)	I,II	$ 225

Optional Items

5	Desktop Publishing - CHOICE model 418	I,II	$2389
	Total		$3140

Electricity/Electronics

	ITEM	LEVEL	PRICE
1	Electricity/Electronics Trainer	I,II	+ $1995
2	Digital Multimeter	I,II	$ 79
3	Logic Probe	I,II	$ 49
4	Oscilloscope, Dual Trace	I,II	$ 795

Optional Items

5	Switching Applications - model D4001 (if ordered with D4000)	I,II	$ 205
6	Automotive Circuitry - model D4002	I,II	$ 394
7	MFA MKII Extended Appraisal Pack (540.125)	I	$ 906
	ALPHA Technology Basic Pack (223.907)	II	$2226
	Battery Connector Pack	II	$ 267
	4MM Leads, Red, 25 CM	II	$ 93
	4MM Leads, Black, 25 CM	II	$ 103
	4MM Leads, Yellow, 25 CM	II	$ 113
8	Function Generator, NIDA model 444	II	$ 232
9	Experiment Circuit Card, PC130A-2	II	$ 285
10	Module 130 A Microprocessor Interface	I,II	$ 285
11	CAI ET COre Card Kit, Model 1350A	I,II	$ 250
12	CAI ET Applications Card Kit, 1350B	II	$ 895
13	ET Core CAI Program Masters	I,II	$ 995
14	ET Applications CAI Masters	II	$ 995
15	Analog Trainer - Heath Model ETW-3600	I,II	$ 218

16	Backpack Model ETW-3576	I,II	$ 218
17	DC Experiment Module ETB-6101	II	$ 322
18	AC Experiment Module ETB-6102	II	$ 322
19	Microprocessor Training Program	I,II	$1185
	Total		$7495

Engineering Structures

	ITEM	LEVEL	PRICE
1	Bridge Building Kit	I,II	$ 70
2	Bridge Building Pins (100/pk)	I,II	$ 2
3	Bridge Tester	I,II	$ 395
4	Chopper II Cutting Tool	I,II	$ 26
5	Balsa Material, 1/8"x1/8"x24" (50/pk)	II	$ 10
6	Hot Glue Gun	II	$ 18
7	Glue Sticks, (30/pk)	II	$ 7

Optional Items

8	Architectural Structures - CHOICE model 416	I,II	$2105
9	Computer Type 2 with mouse	I,II	$1304
10	Structural Stress Analyzer	I,II	$3495
	Advanced Manufacturing Techniques		
11	Tensile Strength Option TT1000	II	$ 750
12	Plotter Interface Option	I,II	$ 75
13	Computer Interface Option	I,II	$ 150
	Total	Level I,II	$ 528

Environmental Impacts

	Item		
1	Large deep baking pan	I,II	$
2	12 Volt Windshield washer pump	I,II	$
3	1/8" diameter plastic tubing	I,II	$
4	8-D size batteries and battery holder	I,II	$
5	Miscellaneous Construction Materials	I,II	$

Optional Items

6	Environmental Technology Program	I	$3800
7	Advanced Environmental Program	II	$7900

Home Maintenance

	ITEM	LEVEL	PRICE
1	Faucet Sets, Kitchen & Lavatory	I,II	$
2	Duplex Receptacle	I,II	$
3	Single Pole Switch	I,II	$
4	Lamp Cord	I,II	$
5	Plug, Two-prong for lamp	I,II	$
6	Lamp Socket	I,II	$
6	PVC Pipe, 1/2"	I,II	$
7	PVC Pipe Couplings, 1/2"	I,II	$
8	PVC Cement	I,II	$
9	Exterior Door w/ Frame	I,II	$
10	Exit Lock Set	I,II	$
11	Window, w/ missing pane	I,II	$
12	Replacement Window Pane, Plexiglass	I,II	$
13	Caulking Compound	I,II	$
14	Caulking Gun	I,II	$
15	Window Screen	I,II	$
16	Screen Repair Kit	I,II	$
17	Replacement Screen	I,II	$
18	Screen Replacement Tools	I,II	$
19	Wall Paneling	I,II	$
20	Paneling Nails	I,II	$
21	Hammer	I,II	$
22	Wallpaper	I,II	$
23	Wallpaper Tools and Supplies	I,II	$
24	Surform Tool	I,II	$
25	Dry Wall Panel	I,II	$
26	Dry Wall Patching Compound	I,II	$

Optional Items

27	Bricklayer - CHOICE model 44	I,II	$1344
28	Cement Mason - CHOICE model 47	I,II	$1638
29	Roofer - CHOICE model 55	I,II	$1487
30	Carpenter - CHOICE model 81s	I,II	$1900
31	Plumber - CHOICE model 82s	I,II	$2686
32	Telephone & TV Installer - CHOICE model 84s	I,II	$1997
33	Insulation Installer - CHOICE model 85s	I,II	$1322
34	Drywall Applicator - CHOICE model 86s	I,II	$1624
35	Tile Setter - CHOICE model 87s	I,II	$1316
36	Painter - CHOICE model 88s	I,II	$1368
37	Wall Covering Installer - CHOICE model 89s	I,II	$1290
38	Glaizer - CHOICE model 90s	I,II	$1290
39	Floor Covering - CHOICE model 91s	I,II	$1600

Laser/Fiber Optics

	ITEM	LEVEL	PRICE
1	Laser Trainer	I,II	$+395
2	Laser Parts Experiment Pack	I,II	$ 40
3	Laser Textbook	I,II	$ 22
4	Laser Student Workbook	I,II	$ 12
5	Instructors Guide	I,II	$ 10
6	Plexiglass Rod, 1/2"x3'	II	$ 2
7	Glass Rod, 1/2"x3'	II	$
8	Light Meter	II	$
9	Light Sources: Candle, Neon, Incandescent, Halogen	II	$
	Total	I	$ 479
		I,II	$1244
	Optional Items		
10	Fiber Optics Course Materials, EE-4201	II	$ 100
11	Digital Trainer, ETW-3700	II	$ 200
12	Multimeter, SM-2311	II	$ 65
13	Oscilloscope	II	$ 400
14	Laser Fundamentals - CHOICE model 426	I,II	$3214
15	Fiber Optic - Power Technology model D8000	I,II	$1871
16	Megatech Fiber Optic Program, Model FO-1	I,II	$ 960
17	Sandbox Holography Set C633	II	$ 189
18	Megatech Communications Technology Center MP-C1 is a turnkey program	I,II	$5290

Mass Production

	ITEM		
	50 Ball point pens in storage box		
	Large box 2' X 3"		
	8 Small parts containers		
	Stop watch		
	Optional Items		
1	Mass Production - CHOICE model 992 (2 table)	I,II	$5081
2	Mass Production - CHOICE model 993 (3 table)	I,II	$6083

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Photography

	ITEM	LEVEL	PRICE
1	Camera,(SLR) Pentax K-1000 (2)	II	$ 260
2	Enlarger, Beseler Cadet 35	I,II	$ 110
3	20 pc. Darkroom Kit (prints)	I,II	$ 80
4	Developing Tank (film)	I,II	$ 15
5	Print Washer	I,II	$ 34
6	Developer, D-76, 1 gal. (film)	I,II	$ 7
7	Developer, Dextol, 1 gal. (print)	I,II	$ 7
8	Stop Bath, 8 gal.	I,II	$ 7
9	Fixer, 1 gal.	I,II	$ 6
10	Paper, Kodabromide F3, 8x10, 100 sheets	I,II	$ 67
11	Chemical Storage Tanks, 2 gal (4)	I,II	$ 100
12	Film, B&W, 35mm, & 120 roll	I,II	$
13	Poster Board	I,II	$
14	Tape, Masking	I,II	$
	Total	I	$ 433
		I,II	$ 693
	Optional Items		
15	Print Dryer	I,II	$ 127
16	Photography System, Model PS, Complete system covering basic Photography, Developing, including 35mm SLR Camera	I,II	$1495

Plastics

	ITEM		
1	Expandable Polystyrene Molds	I,II	$
2	Expandable Polystyrene Beads	I,II	$
3	Injection Molder	I,II	$
4	Injection Molds	I,II	$
5	Injection Molding Pellets	I,II	$
6	Molds for Fiberglass and WEP	I,II	$
7	Starter Fiberglass Kit	I,II	$
8	WEP	I,II	$
9	Vacuum Former	I,II	$
10	Sheets of vacuum forming plastic	I,II	$
11	Polyester Resin Cast	I,II	$
12	Polyester Resin Cast Molds	I,II	$
13	Liquid Plastisol	I,II	$
14	Liquid Plastisol Molds	I,II	$
15	Oven	I,II	$

Problem Solving

	ITEM		
1	Microelectronics for All - Making Decisions	I,II	$

Production

	ITEM	LEVEL	PRICE
1	Saw - Scroll, 16" Benchtop	I,II	$ 140
2	Saw - Band, 10" Benchtop	I,II	$ 140
3	Drill Press - 10" Benchtop	I,II	$ 185
4	Sander - 1" belt/8" disk	I,II	$ 185
5	Vacuum Cleaner - 16 gal. Wet-Dry	I,II	$ 125
6	Vises - Bench mount & Drill press (various)	I,II	$ 150
7	Miter Gauge - Fits benchtop tools	I,II	$ 17
8	Drill Bit Set - 15 bits 1/16" - 1/2"	I,II	$ 50
9	Sanding Belts - Fine Grit 1"x42" (10/pk)	I,II	$ 5
10	- Medium Grit	I,II	$ 5
11	- Coarse Grit	I,II	$ 5
12	Miscellaneous Supplies Sand paper Saw Blades Wood Acrylic Wood Finish Materials	I,II	$ 100
13	Miscellaneous Hand Tools File Set Buffer Screwdriver Set Mallet Tri-Square	I,II	$ 200
14	Strip Heater	I,II	
	Optional Items		
15	Mass Production - CHOICE model 992 (2 table)	I,II	$5081
16	Mass Production - CHOICE model 993 (3 table)	I,II	$6083
	Total	I,II	$1307

Programmable Controllers (II)

	ITEM		
1	Programmable Control Trainer	II	$2695
	Optional Items		
2	Festo Stamping Machine for PLC Control	II	$2975
3	Modular 3 Axis Device	II	$3115
4	Power Supply for 2 or 3	II	$ 277

Research and Design

	ITEM	LEVEL	PRICE
1	Manual Start Raceway	I,II	$ 195
2	Metric Dragster Kit (100/pk)	I,II	$ 405
3	Metric 500 go/no-go Gauge 10	I,II	$ 27

4	Scales - Gram	I,II	$ 6
5	Miscellaneous Supplies Sand paper Paint Hand Cleaner	I,II	$ 200
6	Spray Booth	I,II	$ 20
7	Solar Engineering Kit (car) 10	I,II	$ 122
8	MagLev Racer	I,II	$ 178
9	MagLev Computer Control System (IBM)	I,II	$ 99
10	Power Supply Assembly (for MagLev)	I,II	$ 39
11	Platform Cars (5/pk)	I,II	$ 10
12	Masonite Platforms (10/pk)	I,II	$ 10
13	DC Motor 1.5V - 6V (20+ .45/ea) 20	I,II	$ 9
14	Solar Panel 3/4"x1 1/2" .45VDC, 1.5 Amp	I,II	$ 6
15	Plywood, 1/4"	II	$
16	Black Paint	II	$
17	Plastic Wrap	II	$
18	Tubing	II	$
19	Thermometer	II	$
	Optional Items		
20	Aerospace Engineering - CHOICE model 473p	I,II	$2093
21	Architectural Structures - CHOICE model 416	I,II	$2105
	Total	I,II	$1326

Robotics

	ITEM	LEVEL	PRICE
1	Robot Arm	I,II	$3495
2	Text and Software for Robotic Arm	I,II	$ 150
	Total	I,II	$3645
	Optional Items		
3	RS232 Cable	I,II	$ 57
4	Gravity Feeder	II	$ 157
5	Electronic Interface	II	$1787
6	Pneumatic Robotic Workcell - Power Tech Model D7000	I,II	$4290
7	Sound Operated Robot	I,II	$ 26
8	Line Tracer Robot	I,II	$ 36
9	Programmable Robot	I,II	$ 57
10	Robot Wheel	I,II	$ 58
11	Robot Navigator	I,II	$ 58
12	Robot Walker	I,II	$ 39

Transportation

	ITEM	LEVEL	PRICE
* NOTE: The following items are also listed for the Research and Design module. Duplication is not necessary.			
1	Solar Engineering Kit (car) 10	I,II	$ 122
2	MagLev Racer	I,II	$ 178
3	MagLev Computer Control System (IBM)	I,II	$ 99
4	Power Supply Assembly (for MagLev)	I,II	$ 39
5	Platform Cars (5/pk)	I,II	$ 10
6	Masonite Platforms (10/pk)	I,II	$ 10
7	DC Motor 1.5V - 6V (20+ .45/ea) 20	I,II	$ 9
8	Solar Panel 3/4"x1 1/2" .45VDC, 1.5 Amp	I,II	$ 6
* The following items are for the Transportation module only.			
9	Power Mechanics Equipment and Tools	II	$1538
10	Exhaust System	II	$ 380
	Optional Items		
11	Rail Systems - CHOICE model 412	I,II	$4156
12	MP150AV 4-cycle Activity Center	I,II	$4750
13	Solar Powered Stirling Engine	I,II	$ 550
14	CAT-16 Airtrack with computer photogate timing system, includes basic airtrack with full accessories	II	$ 849
15	CAT-25 Airtrack with Ultrasonic Measurement Basic Airtrack with accessories	II	$ 949
16	Small Engine Workstation	I,II	$4900
	Total	I	$ 473
		I,II	$2391

VENDORS

The following listing contains the names and addresses of vendors that can supply the equipment and supplies listed for the technology education modules. After each vendor listing is the module title(s) and item number(s) the vendor can supply. Many of these items can be obtained from other sources and you are encouraged to select the vendor of your choice.

General Safety Equipment	
LOCAL VENDOR	Items 1,2
PITSCO	Items 1,3
IASCO	Items 1-3
General Audio/Video Equipment	
SEARS	Items 1,2,4
HERBACH & RADEMAN	Item 3
Aerospace	
PITSCO	Items 1-26
LOCAL VE R	Items 27-29
IASCO	Items 1-9 11-20 24
SIMC TRAINING SYSTEMS	Items 30-31
Alternate Energy Systems	
MEGATECH	Items 3-8
SIMC TRAINING SYSTEMS	Items 1-2
Applied Physics	
TECHNICAL TRAINING AIDS	Items 1-6
BUCKEYE EDUCATIONAL SYSTEMS	Items 1-6
SOUTHERN EDUCATIONAL SYSTEMS	Items 1,2,3
SIMC TRAINING SYSTEMS	Items 1-6
MEGATECH	Items 1,2,3,5
Audio-Video	
SEARS	Items 1,12-17
RADIO SHACK	Items 2-11,20
LOCAL VENDOR	Items 18,19
SIMC TRAINING SYSTEMS	Item 21

Biotechnology

TRANSTECH	Items 1-2
CAROLINA BIOLOGICAL SUPPLY COMPANY	Items 3-7
LOCAL VENDOR	Items 8-11

Careers

No dedicated equipment

Computer Aided Drafting

CBM COMPUTER CENTER	Item 1
GRAVES - HUMPHREYS	Items 2-3
TENEX COMPUTER EXPRESS	Item 4
TECHNICAL TRAINING AIDS	Item 7-11
LOCAL VENDOR	Item 6

Computer Graphics

CBM COMPUTER CENTER	Item 1
TENEX COMPUTER EXPRESS	Item 2
SIMC TRAINING SYSTEMS	Items 1,3,4

Computer Numerical Control/Computer Assisted Manufacturing

SEARS	Item 1
TECHNICAL TRAINING AIDS	Items 2-5
HYDUN LAB ASSOCIATES	Items 1-5
BUCKEYE EDUCATIONAL SYSTEMS	Items 1-5
SIMC TRAINING SYSTEMS	Items 1-3

Desktop Publishing

CBM COMPUTER CENTER	Item 1
COMPUADD	Item 2
SEARS	Item 3
SIMC TRAINING SYSTEMS	Item 5

Electricity/Electronics

TECHNICAL TRAINING AIDS	Items 1-4 8-18
BUCKEYE EDUCATIONAL SYSTEMS	Items 1-4
SIMC TRAINING SYSTEMS	Items 1-7
SOUTHERN EDUCATION SYSTEMS	Items 1-4 19
MEGATECH	Items 1-4

Engineering Structures

PITSCO	Items 1-7

IN THE 21ST CENTURY

IASCO	Items 1-7
SIMC TRAINING SYSTEMS	Items 8-9
TECHNICAL TRAINING AIDS	Items 10-13

Environmental Impacts

MEGATECH	Items 6&7

Home Repair

LOCAL VENDOR	Items 1-26
SIMC TRAINING SYSTEMS	Items 27-39

Laser and Fiber Optic Technology

TECHNICAL TRAINING AIDS	Items 1-5 10-14
PITSCO	Items 6-7
LOCAL VENDOR	Items 8,9
IASCO	Item 6
BUCKEYE EDUCATIONAL SYSTEMS	Items 1-5 10-13
SOUTHERN EDUCATIONAL SYSTEMS	Items 1-5 10-13
SIMC TRAINING SYSTEMS	Items 1-5 14-15
MEGATECH	Items 1-5 10-13 16-18

MASS PRODUCTION

SIMC TRAINING SYSTEMS	Items 1-2
LOCAL VENDOR	

Photography

SUPREME CAMERA	Items 1-3
GRAVES-HUMPHREYS	Items 4-11,A
LOCAL VENDOR	Items 12-14
SIMC TRAINING SYSTEMS	Item 16

Plastics

IASCO	Items 1-14
MEGATECH	Item 9

Production

SEARS	Items 1-14
SIMC TRAINING SYSTEMS	ITems 15-16

Programmable Controls

TECHNICAL TRAINING AIDS	Item 1
BUCKEYE EDUCATIONAL SYSTEMS	Item 1
SOUTHERN EDUCATION SYSTEMS	Item 1

SIMC TRAINING SYSTEMS	Items 1-4
MEGATECH	Item 1

Research and Design

PITSCO	Items 1-7
KELVIN	Items 8-14
LOCAL VENDOR	Items 15-19
IASCO	Items 1,2,13
SIMC TRAINING SYSTEMS	Items 20-21

Robotics

TECHNICAL TRAINING AIDS	Items 1-5
KELVIN	Item 5
SOUTHERN EDUCATIONL SYSTEMS	Items 1-2 7-12
BUCKEYE EDUCATION SYSTEMS	Items 1-2
SIMC TRAINING SYSTEMS	Items 1,2,6
MEGATECH	Items 1-2 7-12

Transportation

PITSCO	Item 1
KELVIN ELECTRONICS	Items 2-8
GRAVES-HUMPHREYS	Items 9,10
MEGATECH	Items 12-16
SIMC TRAINING SYSTEMS	Item 11

VENDOR ADDRESSES

CBM COMPUTER CENTER
198 Moore Drive
Lexington, KY 40503
(606)276-3579

GRAVES - HUMPHREYS
1948 Franklin Rd., S.W.
P.O. Box 13407
Roanoke, VA 24033
1-(800)-336-5998

IASCO
5724 West 36th St.
Minneapolis, MN 55416-2594
(612) 920-7393

PITSCO
P.O. Box 1328
Pittsburg, KS 66762

COMPUADD
12303 Technology Blvd.
Austin, TX 78727
1 (800) 666-1872

HERBACH & RADEMAN
401 East Erie Avenue
Phila., PA 19134-1187
1 (800) 848-8001

KELVIN ELECTRONICS
7 Fairchild Ave.
Plainview, NY 11803
800-645-9212

SEARS, ROEBUCK and CO.
P.O. Box 7780593
Wichita, KS 67278-0593

IN THE 21ST CENTURY

SUPREME CAMERA
2123 Utica Avenue
Brooklyn, NY 11234
1 (800) 332-2661

TENEX COMPUTER EXPRESS
56800 Magnetic Drive
Mishawaka, IN 46545
(219) 259-7051

SOUTHERN EDUCATIONL SYSTEMS
Rt. 3, Box 65B
Prosperity, SC 29127
(803) 945-7568

BUCKEYE EDUCATIONAL SYSTEMS
150 Industrial Drive
Lexington, OH 44904
800-522-0460

MEGATECH
29 Cook St.
Billerica, MA 01821
(617)273-1900

TECHNICAL TRAINING AIDS
P.O. Box 17537
Covington, KY 41017
(606) 331-6665

HYDUN LAB ASSOCIATES, INC
P O Box 1024
Powell, OH 43065
(614) 848-9997

SIMC TRAINING SYSTEMS
3749 Dewlawn Dr.
Toledo, OH 43614
800-421-7462

CAROLINA BIOLOGICAL
Main Office & Lab
2700 York Rd.
Burlington, NC 27215
(919) 584-0381

BOOKS, COMPUTER SOFTWARE, AND AUDIOVISUAL MATERIALS

The following list contains items that are not included with equipment already listed. The first column of the list contains the vendor code. The vendor list follows this section. The second column identifies the item as a book (BK), a videotape (VT), a filmstrip (FS), or computer software (CS). The price, where available, is the price indicated by the listed vendor.

Aerospace

33	BK	Living with Technology	
1	VT	The History of Flight	$30
50	VT	America's Wings	
30	BK	Moving Goods and People Through Space	
50	VT	Eating and Sleeping in Space	
1	VT	America in Space	$30
50	VT	Space Research & You: Your Transportation	$15
	VT	Flight Simulator	
29	CS	Flight Simulator II	
55	CS	Aeronautics Disk	$50
28	CS	Space M+A+X	
31	CS	Flight - The Aerodynamics of Model Rockets	$49

Alternate Energy Systems

33	BK	Living with Technology	
51	VT	Energy for Societies	$ 150
35	BK	Exploring Energy	
52	VT	The Solar Generation	
53	VT	Harness the Wind	
54	VT	Binary-Cycle Geothermal Power	
54	VT	Ocean Thermal Energy Conversion	
54	VT	Petroculture	

Applied Physics

3	BK	Usborne, Introduction to Physics,	
32	FS	What is Physics,	$ 35

Audio-Video

2	VT	Format Analysis and Writing for Videotape

34	VT	How to Light for Your Video		
34	VT	How to Record Sound for Your Video		

Biotechnology

33	BK	Technology In Your World		
32	CS	The Body Transparent		$ 45
32	VT	Genetic Engineering		$ 50
60	BK	Technology For Tomorrow		$
61	BK	Careers in Biotechnology		
62	VT	The Chemical Engineer in Biotechnology		

Careers

44	VT	Career Goals: Your Ladder to Success		$ 98
46	BK	Career Skills		$ 22
49	CS	Computerized Career Directions		$ 100
49	VT	Career Strategies		$ 50
49	VT	Career Strategies		$ 50
49	VT	Voyage: What Is Work		$ 75
49	VT	The Inside Secrets of Interviewing		$ 30
49	CS	Expectations on the Job		$ 80
		Kentucky Occupational Information		
		Map of the State of Kentucky		
		State Information Book		
		Newspapers		
		Letter of Application (examples)		

Computer Aided Drafting

33	BK	Living with Technology		
35	BK	Exploring Drafting		
25	CS	AutoSketch V. 2, Enhanced	I	$ 100
25	CS	AutoCAD Ver. 10	II	$ 455
25	CS	PC Paintbrush IV	II	$ 80
25	CS	ASG Architectural	II	$ 275
25	CS	ASG Core	II	$ 170

Computer Graphics

17		Graphics Applications		
18	BK	Creative Computer Graphics		
19	VT	Creative Computer Graphics		
20	VT	Computer Magic		

25	CS	Animator	$ 255
36	CS	Printshop	$ 60

CNC/CAM

25	CS	AutoSketch CAD to CNC	$ 125
25	CS	Engraver Program Robotmart S1-03	$ 190
6	VT	The Hardware or	$ 85
49	VT	Practical CNC Training: Part I	$ 95

Desktop Publishing

33	BK	Living with Technology,	
24	CS	PFS: First Publisher	$ 95
24	CS	PrintShop	$ 60
24	CS	WordPerfect	$ 135
36	CS	OCR Cat Eyes	

Electricity/Electronics

8	VT	Basic Electricity
5	VT	Electronics - An Introduction
12	VT	Introduction to Electricity

Engineering Structures

37	VT	Monument to the Dream	
38	BK	Construction	
32	VT	The Construction of Hoover Dam	$ 30
16	VT	The Astrodome	

Environmental Impacts

57	BK	Exploring Production Systems	
32	FS	Our Precious Environment	$ 150
35	BK	Understanding Technology	$
42	CS	Air Pollution	$ 49
42	CS	Water Pollution	$ 49
3	CS	Environment Disk IV: Global Questions	$ 80

Home Maintenance

7	VT	Repairs: A Series, Weatherize
11	VT	Walls
11	VT	Plumbing and Electrical
9	BK	Indoor Home Repairs Made Easy
10	BK	Step-by-step Household Repairs
13	VT	Making Basic Plumbing Repairs

Laser/Fiber Optic Technology

3	BK	Usborne New Technology - Lasers	$ 6
31	BK	Laser Theta High Tech Series	
40	VT	Lasers	
4	VT	Light on Lasers	
5	VT	The Laser - A Light Fantastic	
41	BK	Understanding Fiber Optics	$ 18

Mass Production

33	BK	Living with Technology
55	VT	Automobile Manufacturing
56	SW	Person/Machine Chart Analyses
56	SW	Material Requirements Planning
56	SW	Flow Process
56	SW	Gantt Chart
56	SW	Production Work Order
35	BK	Computer Programs for IA/TE
43	BK	Basic Manufacturing

Photography

42	VT	Basic Camera
35	BK	Exploring Photography

Plastics

43	BK	Production Technology
30	BK	How to Work with Plastics and Equipment
49	SW	Secondary Plastics and Related Review
49	VT	Introduction to Plastics
49	VT	Thermoforming Plastics
30	VT	Fiberglass Bathbay Repair Video
30	BK	Working with Fiberglass: Techniques and Projects

Problem Solving

33	BK	Living with Technology	
39	BK	Modular Courses in Technology:Problem Solving	
6	VT	Exploring Technology: The Universal Systems Model	$ 85

Production

43	BK	Production Technology	
57	VT	Wood:The Unique Material	
3	VT	Introduction to Plastics	$59
46	BK	Wood: Technology and Processes	
45	VT	How to Stain and Finish with Deft	

Programmable Controls

No additional items required.

Research and Design

24	CS	Car Builder	
32	CS	Learning About Solar Energy	$100
3	VT	Believing the Dream	$ 59
	VT	Race Day	
31	VT	Designing Your Dragster	
47	VT	Energy for Free	

Robotics

3	BK	Usborne New Technology - Robotics	$ 6
3	VT	Applications of Robot Technology	
3	VT	Robots In Industry	
3	VT	Fundamentals of Robotics	$95

Transportation

21	VT	Development of Transportation,
21	VT	Transportation - A Basic Need,
22	VT	Highways are for People,
23	VT	Trains,
5	VT	Airplanes - A First Film,
14	VT	Transportation By Inland Waterways,
15	VT	Pipe Dream to Pipeline,

IN THE 21ST CENTURY

26	VT	Sunracer,	
49	VT	The 4-Stroke Cycle,	$ 40
35	BK	Exploring Power Technology,	
48	CS	Test Drive	
35	FS	Basic Principles,	$295/set
35	FS	Mechanical System,	
35	FS	Lubrication and Cooling,	
35	FS	Ignition Systems,	
35	FS	Tune Up - Ignition,	
35	FS	Reassembly and Starting,	
35	FS	Fuel System,	
35	FS	Tune Up - Fuel,	
35	FS	Preventive Maintenance,	
35	FS	Trouble Shooting,	

SOURCES

1 Finley-Holiday Film Corp.
P.O. Box 619, Dept. C5
Whittier, CA 90601

2 Video International Publishers
270 N Canon Dr. ST. 103
Beverly Hills, CA 90201

3 PITSCO
P.O. Box 1328
Pittsburg, KS 66762
800-835-0686

4 Media Guild
11722 Sorrento Valley Rd.
Suite E
San Diego, CA 92121

5 Phoenix - BFA Films and Video, Inc.
470 Park Ave. South
New York, NY 10016

6 Bergwall Productions, Inc.
106 Charles Lindbergh Blvd.
Uniondale, NY 11553
800-645-3565

7 Green Mountain Cine Works
53 Hamilton Ave.
Staten Island, NY 10301

8 Aviation Maintenance Publishers
PO Box 36
1000 College View Dr.
Riverton, WY 82501

9 Butterick Publishing
708 Third Ave.
New York, NY 10017

10 Better Homes and Gardens Books
Meredith Corporation
Des Moines, IA

IN THE 21ST CENTURY

11 Do It Yourself, Inc.
Charolette, NC

12 Tex Instruments Learning Ctr.
Mail Station 54
PO Box 225012
Dallas, TX 75265

13 RMI Media Productions
2807 W. 47th St.
Shawnee Mission, KS 66205

14 Filmfair Communications
10900 Ventura Blvd.
Studio City, CA 91604

15 Goodyear Tire and Rubber
1144 E. Market St.
Akron, OH 44316

16 Motion Picture Services
PO Box 252
Livingston, NJ 07039
(201) 992-8194

17 Deltak, Inc.
1751 Diehl Rd.
Naperville, IL 60566

18 Cambridge University Press
40 West 20th Street
New York, NY 10011

19 Frost and Sullivan, Inc.
Department R-1
106 Fulton Street
New York, NY 10038

20 Cinemagic Productions
537 Jones St.
#898
San Francisco, CA 94102

21 Encyclopedia Britannica Educ. Corp.
425 N. Michigan Ave.
Chicago, IL 60611

22 United States National Audiovisual Center
8700 Edgeworth Dr.
Capitol Heights, MD 20743

23 Aims Media, Inc.
6901 Woodley Ave.
Van Nuys, CA 91406

24 Modern School Supplies, Inc.
P.O. Box 958
Hartford, CT 06143
800-243-2329

25 Technical Training Aids
P.O. Box 17537
Covington, KY 41017
(606) 331-6665

26 General Motors Corp.
Detroit, MI

27 .MENU
Order Entry Department
1520 South College Ave.
Fort Collins, CO. 80524

28 Final Frontier Software
43334 32nd W
Unit 42
Lancaster, CA 93536
(818) 943-5394

29 Radio Shack
A Division of Tandy Corp.
Fortworth, TX 76102

30 IASCO
Industrial Arts Supply Co.
5724 West 36th Street
Minneapolis, MN 55416-2594
(612) 920-7393

31 Hearlihy & Co.
714 W. Columbia St.
P.O. Box 869
Springfield, OH 45501
800-622-1000

32 Carolina Biological Supply Company
Main Office & Laboratories
2700 York Rd.
Burlington, NC 27215
800-334-5551

33 Delmar Publishers
2 Computer Drive, West
Box 15015
Albany, NY 12212-5015
812-438-2502

34 Kartes Video Communication
7225 Woodland Dr.
Indianapolis, IN 46278

35 Goodheart - Wilcox
123 West Taft Drive
South Holland, IL 60473-2089
708-333-7200

36 CompuAdd
12303 Technology Blvd.
Austin, TX 78727

37 Jefferson National
11 North 4th Street
St. Louis, MO

38 THETA Industrial
P.O. Box 70
Mound, MN 63102
708-799-6560

39 Trans Tech Systems
Creative Learning Systems, Inc.
9899 Hibert, Suite C
San Diego, CA 92131

40 Metro Nashville Public Schools
2601 Brandsford Ave.
Nashville, TN
(615) 259-8720

41 Kelvin Electronics
7 Fairchild Ave.
Plainview, NY 11803
800-645-9212

42 Southern Educational Systems, Inc.
5115 Maryland Way
Brentwood, TN 37027
(615) 377-0742

43 Bennett & McKnight
Division of Glencoe
936 Eastwind Dr.
Westerville, OH 43081

44 Cambridge Vocational & Technical
P O Box 2135, Dept. V05
Charleston, WV 25328
800-468-4227

45 Deft
612 Maple Ave.
Torrance, CA 90503

46 Glencoe
936 Eastwind Drive
Westerville, OH 43081

47 Kentucky Department of Energy
Frankfort, KY
(502) 564-7192

48 Ford Motor Company
Dearborne, MI

49 Career Aids Inc.
20417 Nordoff St.
Dept. IN
Chatsworth, CA 91311

50 Tina Salyer
NASA CORE
Lorain County Joint Vocational School
15181 Rt. 58 S.
Oberlin, OH 44074
(216) 774-1051

51 AIT
Box A
Bloomington, IN 47802

54

52 Stuart Finley
3428 Mansfield Rd.
Falls Church, VA 22041

53 Bullfrog Films
Orley, PA 19457

54 James L. Ruhle & Assoc.
P.O. Box 4301
Fullerton, CA 92634

55 Morris Video
413 Ave. G. #1
P O Box 443
Redondo Beach CA

56 Wisconsin Technology Education Association
University of Wisconsin-Stout
Menomonie, WI 54751

57 Davis Publications, Inc.
Worcester, MA

58 Ain Plastics
249 E. Sandford Blvd.
P O Box 151
Mt. Vernon, NY 10550

59 Science Software
7370 S. Jay St.
Littleton, CO 80123

60 South-Western
5101 Madison Rd.
Cincinnati, OH 45227
(513) 398-1122

61 The Industrial Biotechnology Association
2115 East Jefferson St.
Rockville, MD 20852

62 American Institute of Chemical Engineers
Career Guidance Division
345 E. 47 St.
New York City, NY 10017
(212) 705-7319

FLOOR PLANS, CABINETS, AND PARTITIONS

Appendix B - Supplemental Materials, contains examples of the design of a Technology Education lab. Sample floor plans for all or parts of lab areas are included to give you an idea of the layout of the lab. The suggested minimum floor area for a technology lab is 2725 square feet. With proper planning this would allow room for a lecture area as well as the module stations. Although there is no maximum floor area keep in mind that you will have to move around the lab while you are helping students.

The cabinet and furniture designs are some that have been used in other technology labs. It is possible to have a technology program with other types of furnishings. However, it is much better to start the program with the proper furnishing to prevent damage to equipment and materials. Trying to "make do" can easily lead to even greater expense in the long run.

The partitions between modules should be constructed to allow the students a sense of privacy yet allow the instructor to observe the activities. Partitions that hide the student can lead to problems with safety, abuse of equipment and materials, and less productive work. Ideally some method should be provided for the students to signal the instructor that they need help without having to leave the module.

CONCLUSION

It is our hope that this implementation guide will help you in setting up a technology education program. Many hours have gone into the planning, writing, and production of this guide. We would like to offer our thanks to many who have been of help to us in preparing this document.

Herb Wedig
Technical Training Aids

For his help in obtaining materials for review, discussing curriculum options, and presenting training seminars for teachers.

Parkway Junior High School
Jackson, Tennessee

Glencliff High School
Nashville, Tennessee

J.T. Moore Middle School
Nashville, Tennessee

Robert Dickens
Coordinator for Vocational Education
Nashville Metropolitan Public Schools
Nashville, Tennessee

Ronald G. Barker
State Supervisor, Industrial Arts/Technology Education
Georgia Department of Education
Atlanta, Georgia

Michael W. Neden
Supervisor, Technology Education
Delta County Joint School District
Delta, Colorado

For supplying information about the programs that have already been started in the schools they represent.

Bell Co. Middle School
Spencer Co. High School
Marshall County High School
Fayette County, Dunbar High School
Greenwood High School
Russellville High School

The schools and teachers in Kentucky that had the courage and foresight to begin this program or parts of it on an experimental basis.

Joyce Wogoman
Winchester, Kentucky

For the assembly and development of curriculum materials for the technology education program.

Drafting Students
Jeffersontown AVEC
Louisville, KY

For the example floor plans for the technology education program.

APPENDIX A

FORMS

STUDENT SIGN-UP SHEET

This sheet is to be used to select the modules you would like to complete during class. You should number all of the modules listed from first choice to last choice. Do not leave out any of the modules. After you have completed numbering the modules return this sheet to your instructor. Your instructor will randomly select students for placement into the module rotation schedule.

_____ AEROSPACE

_____ ALTERNATE ENERGY SYSTEMS

_____ APPLIED PHYSICS

_____ AUDIO-VIDEO

_____ COMPUTER AIDED DRAFTING

_____ COMPUTER GRAPHICS

_____ COMPUTER NUMERICAL CONTROL/COMPUTER ASSISTED MANUFACTURING

_____ DESKTOP PUBLISHING

_____ ELECTRICITY/ELECTRONICS

_____ ENGINEERING STRUCTURES

_____ HOME MAINTENANCE

_____ LASER/FIBER OPTIC TECHNOLOGY

_____ MASS PRODUCTION

_____ PHOTOGRAPHY

_____ PROGRAMMABLE CONTROLLERS

_____ RESEARCH AND DESIGN

_____ ROBOTICS

_____ TRANSPORTATION

_____ _____

MODULE ROTATION
SETUP SHEET

The following setup sheet will allow placing students in modules with a minimum of bias. Using this form will give every student an equal chance to work on the module of his or her choice.

To use this sheet first have each student fill out a module selection sheet indicating the modules he or she would like to study by ranking the modules from first to last choice. Each student should include all of the modules available in the lab on the selection sheet. Each selection sheet should be given a number from 1 to 30. These numbers do not have to be in order but no number should be used more than once.

Using the random number table below select a starting point by closing your eyes and placing the point of a pencil somewhere on the table. The number that is selected is the student that is placed in one of the slots in the first time slot for the module selected as the first choice by the student. If the pencil lands on a number that doesn't correspond to a student number then go across the number list until you get to a number that does match a student number. Continue across the list of numbers placing students in their first choice as long as there are slots open on the schedule. If a student's first choice is full when you reach that student's number then place the student in his or her second choice module. After each student has been placed in one module repeat the process of selecting a starting point and placing students until each student has been placed in a second module. Repeat as many times as necessary to fill the semester or year's schedule.

RANDOM NUMBER TABLE

3	20	26	22	24	2	15	14	29	
21	16	30	9	28	17	10	4	13	1
23	7	11	8	27	12	6	18	5	25
19									

MODULE ROTATION SCHEDULE

LEVEL & TIME PER MODULE - LEVEL I, 2 WEEKS ____
LEVEL II, 4 WEEKS ____

TOTAL TIME ____ WEEKS | NUMBER OF SESSIONS ____ | PAGE ___ of ___

MODULE	SESSION ____	SESSION ____	SESSION ____	SESSION ____

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STUDENT RECORD SHEET

This sheet is to be used to record student records for attendance and test scores.

STUDENT'S NAME ______________________________

MODULE ____________________ PRE-TEST __________ POST TEST ________

ATTENDANCE FROM ____________ to _____________

										WRITE THE DATE IN THE SPACES TO THE LEFT FOR EACH DAY OF ATTENDANCE

MODULE ____________________ PRE-TEST __________ POST TEST ________

ATTENDANCE FROM ____________ to _____________

										WRITE THE DATE IN THE SPACES TO THE LEFT FOR EACH DAY OF ATTENDANCE

MODULE ____________________ PRE-TEST __________ POST TEST ________

ATTENDANCE FROM ____________ to _____________

										WRITE THE DATE IN THE SPACES TO THE LEFT FOR EACH DAY OF ATTENDANCE

MODULE ____________________ PRE-TEST __________ POST TEST ________

ATTENDANCE FROM ____________ to _____________

										WRITE THE DATE IN THE SPACES TO THE LEFT FOR EACH DAY OF ATTENDANCE

MODULE ____________________ PRE-TEST __________ POST TEST ________

ATTENDANCE FROM ____________ to _____________

										WRITE THE DATE IN THE SPACES TO THE LEFT FOR EACH DAY OF ATTENDANCE

DISCIPLINE ACTION SHEET
TECHNOLOGY EDUCATION LAB

This sheet is to be used to record discipline actions taken against the student listed below.

STUDENT'S NAME _____

PERIOD _____

GRADE _____

PARENT/GUARDIAN _____

PHONE NUMBER _____

FIRST DISIPLINE ACTION TAKEN ON (DATE) _____

REASON FOR ACTION _____

_____

_____

SECOND DISIPLINE ACTION TAKEN ON (DATE) _____

REASON FOR ACTION _____

_____

_____

PARENT OR GUARDIAN NOTIFIED (DATE AND TIME) _____

THIRD DISIPLINE ACTION TAKEN ON (DATE) _____

REASON FOR ACTION _____

_____

_____

PARENT OR GUARDIAN NOTIFIED (DATE AND TIME) _____

STUDENT LOSES ALL LAB PRIVILEGES

INSTRUCTOR _____

INSTRUCTOR'S SIGNATURE _____

APPENDIX B

SUPPLEMENTAL MATERIALS

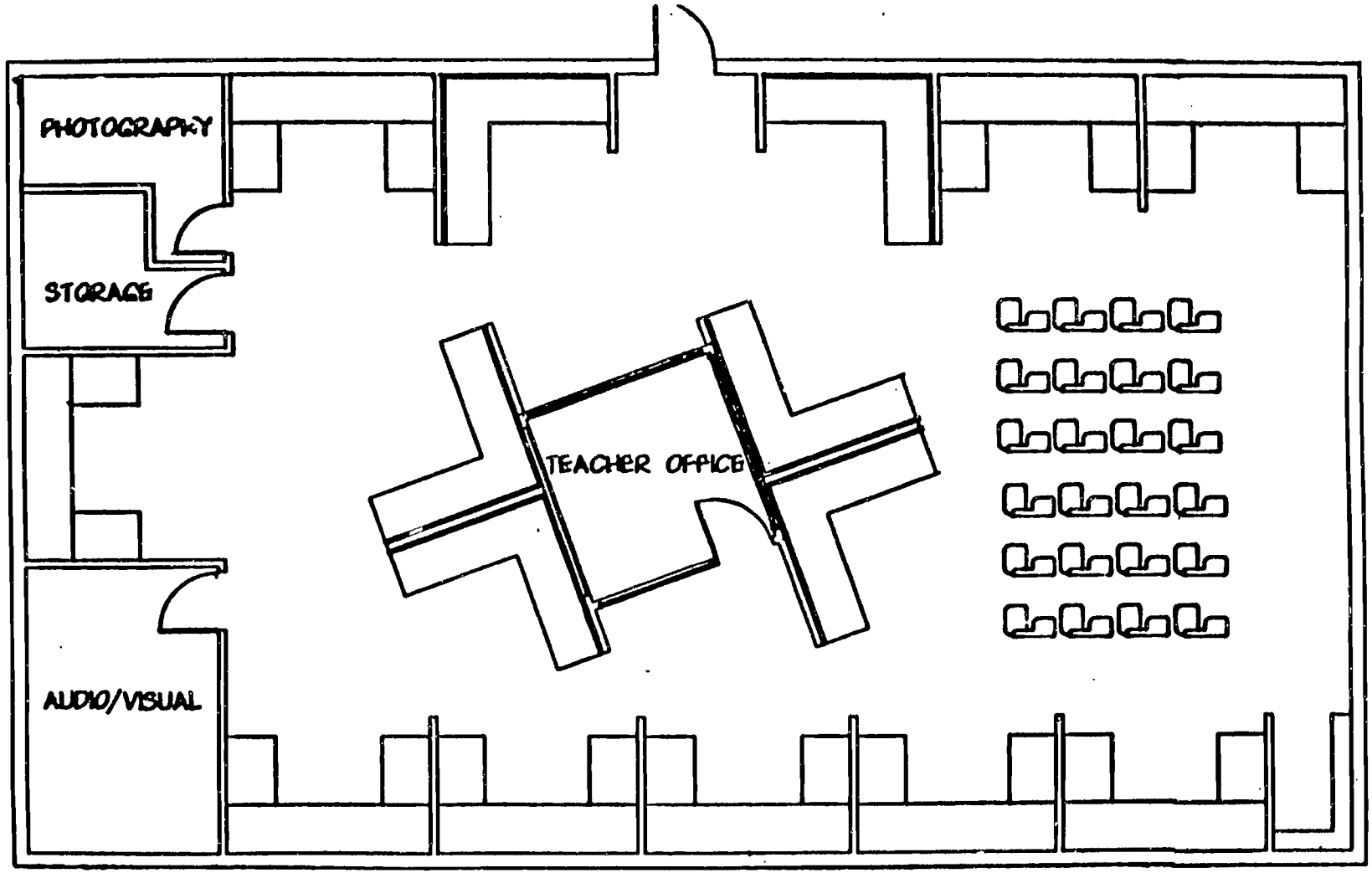
Program	No. of Teachers	Minimum Sq. Ft.	Specific Requirements
Technology Education	1	2725	Classroom within the Laboratory (no dividing walls) 14-16 Modules - Regular, Quad & Duplex Modules 7' x 10' with adequate lighting - 1 Base Cabinet with countertop - 1 Storage Base Cabinet with 6 drawers and countertop - Cabinets 35"W x 24"D x 30"H - Countertop 30"D Enclosed Areas - Storage 100 sq. ft. with shelving - Storage Cabinets - Teacher's Office 75-100 sq. ft. with cabinet, countertops, windows and telephone jack - Optional - Production 150 sq. ft. with 1 base cabinet and countertop, 1 storage base cabinet with 6 drawers and countertop and windows - Audio/Video 150 sq. ft. with 1 base cabinet and countertop, 1 storage base cabinet with 6 drawers and countertop and windows - Photography 75-100 sq. ft. with 1 base cabinet and countertop, 1 storage base cabinet with 6 drawers and countertop (tap water and exhaust) Wash Basin Ceiling Height 8' minimum 12' maximum Call light for each module Wired for computer networking Telephone Jack - in one module Telecable Outlet 6 110 volt electrical outlets per module Book storage for 200 Notebooks and 50 Textbooks Clear visibility from anywhere in the laboratory 5 Modular Base Cabinets should be mobile Air Conditioning 220 volt service to panel box 30 24" stools 30 Student Desk Dry marker Board Tack Board
	2	625 2100	Classroom with windows between the two modular laboratories Modular Laboratory / Teacher 14-16 Modules - Regular, Quad & Duplex Modules 7' x 10' with adequate lighting - 1 Base Cabinet with countertop

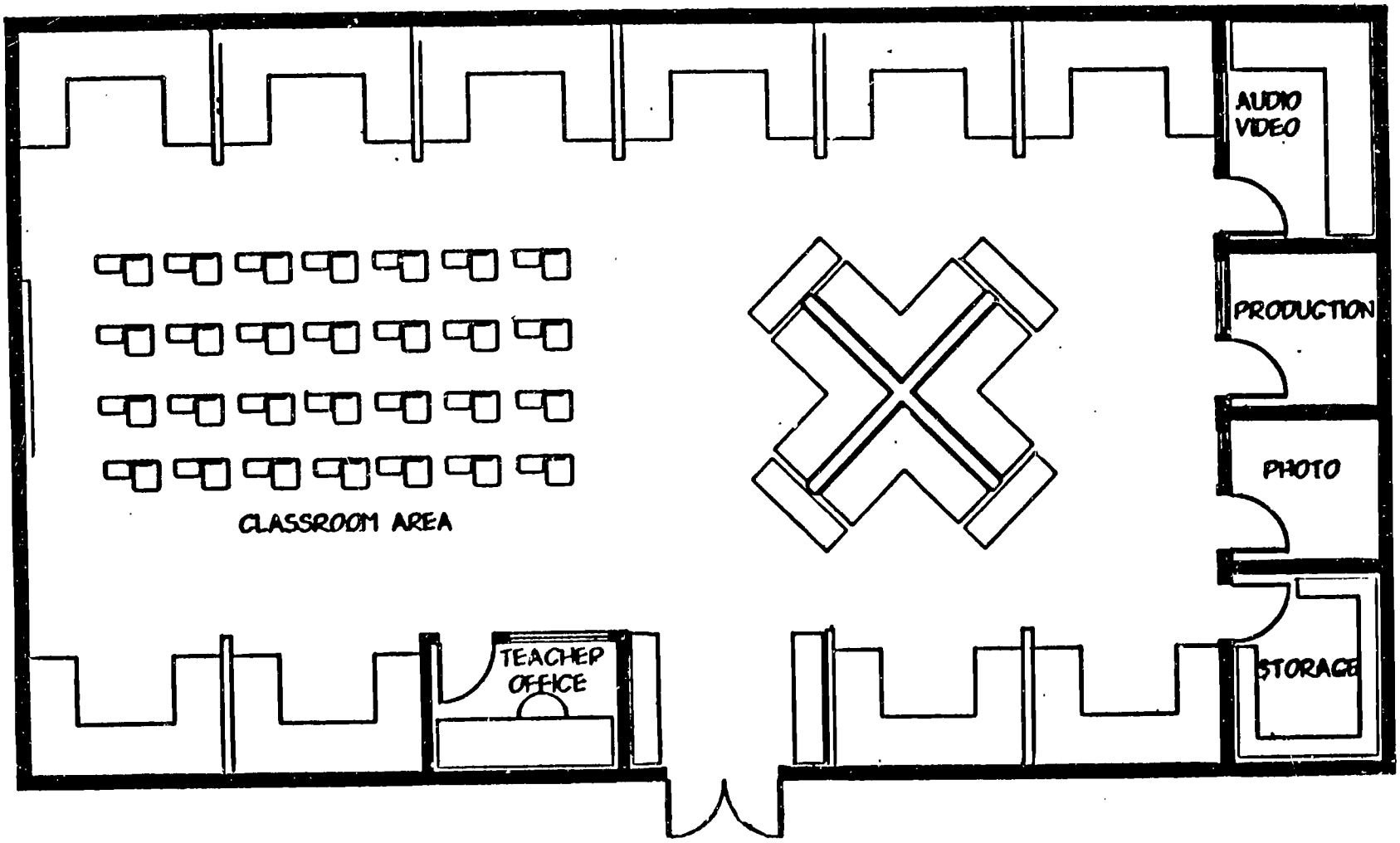
Program	No. of Teachers	Minimum Sq. Ft.	Specific Requirements
Technology Education I (cont.)			- 1 Storage Base Cabinet with 6 drawers and countertop - Cabinets 35"W x 24"D x 30"H - Countertop 30"D Enclosed Areas - Storage 100 sq. ft. with shelving - Storage Cabinets - Teacher's Office 75-100 sq. ft. with cabinet, countertops, windows and telephone jack - Optional - Production 150 sq. ft. with 1 base cabinet and countertop, 1 storage base cabinet with 6 drawers and countertop and windows - Audio/Video 150 sq. ft. with 1 base cabinet and countertop, 1 storage base cabinet with 6 drawers and countertop and windows - Photography 75-100 sq. ft. with 1 base cabinet and countertop, 1 storage base cabinet with 6 drawers and countertop (tap water and exhaust) Wash Basin Ceiling Height 8' Minimum 12' Maximum Call light for each module Wired for computer networking Telephone Jack - in one module Telecable Outlet 6 110 volt electrical outlets per module Book storage for 200 Notebooks and 50 Textbooks Clear visibility from anywhere in laboratory 5 Modular Base Cabinets should be mobile Air Conditioning 220 volt service to panel box 30 24" stools 30 Student desk Dry marker Board Tack Board
Technology Education I & II or Technology Education II	1	2750	Combination Laboratory - Modules (14) Cluster Areas (3) Modules 7' x 10' with adequate lighting - 1 Base Cabinet with countertop - 1 Storage Base Cabinet with 6 drawers and countertop - Cabinets 35"W x 24"D x 30"H - Countertop 30"D Enclosed Areas - Storage 100 sq. ft. with shelving - Storage Cabinets

VOCATIONAL EDUCATION FACILITY REQUIREMENTS

Program	No. of Teachers	Minimum Sq. Ft.	Specific Requirements
Technology Education I & II or Technology Education II (cont.)			- Teacher's Office 75-100 sq. ft. with cabinet, countertops, windows and telephone jack - Production 150 sq. ft. with 1 base cabinet and countertop, 1 storage base cabinet with 6 drawers and countertop and windows - Optional - Audio/Video 150 sq. ft. with 1 base cabinet and countertop, 1 storage base cabinet with 6 drawers and countertop and windows - Photography 75-100 sq. ft. with 1 base cabinet and countertop, 1 storage base cabinet with 6 drawers and countertop (tap water and exhaust) Wash Basin Ceiling Height 8' Minimum 12' Maximum Call light for each module Wired for computer networking Telephone Jack - in one module Telecable Outlet 6 110 volt electrical outlets per module Book storage for 200 Notebooks and 50 Textbooks Clear visibility from anywhere in laboratory 5 modular base cabinets should be mobile Air Conditioning 220 volt service to panel box 30 24" stools 30 Student Desk Dry marker Board Tack Board
Technology Education II	2	2000	Cluster Laboratory - 25 Storage Base Cabinets with 6 drawers and countertops - Cabinets 35"W x 24"D x 30"H - Countertops 30"D - Countertop 30"D x 30"H Enclosed Areas - Storage 100 sq. ft. with shelving - Storage Cabinets - Teacher's Office 75-100 sq. ft. with cabinet, countertop and windows - Production 150 sq. ft. with 1 base cabinet and countertop, 1 storage base cabinet with 6 drawers and countertop and windows - Optional - Audio/Video 150 sq. ft. with 1 base cabinet and countertop, 1 storage

Program	No. of Teachers	Minimum Sq. Ft.	Specific Requirements
Technology Education II (cont.)			base cabinet with 6 drawers and and countertop and windows - Photography 75-100 sq. ft. with 1 base cabinet countertop, 1 storage base cabinet with 6 drawers and countertop (tap water and exhaust) Wash Basin Ceiling Height 8' minimum 12' maximum Wired for computer networking Telephone Jack Telecable Outlet 110 volt electrical outlet every 5 foot Book storage for 200 Notebooks and 50 Textbooks Electrical drop cord every 10 sq. ft. Air Conditioning 220 volt service to panel box 30 24" stools 5 Heavy Duty Round Tables - 29"H x 60"Rd Dry marker Board Tack Board


PHOTOGRAPHY
STORAGE
TEACHER OFFICE
AUDIO/VISUAL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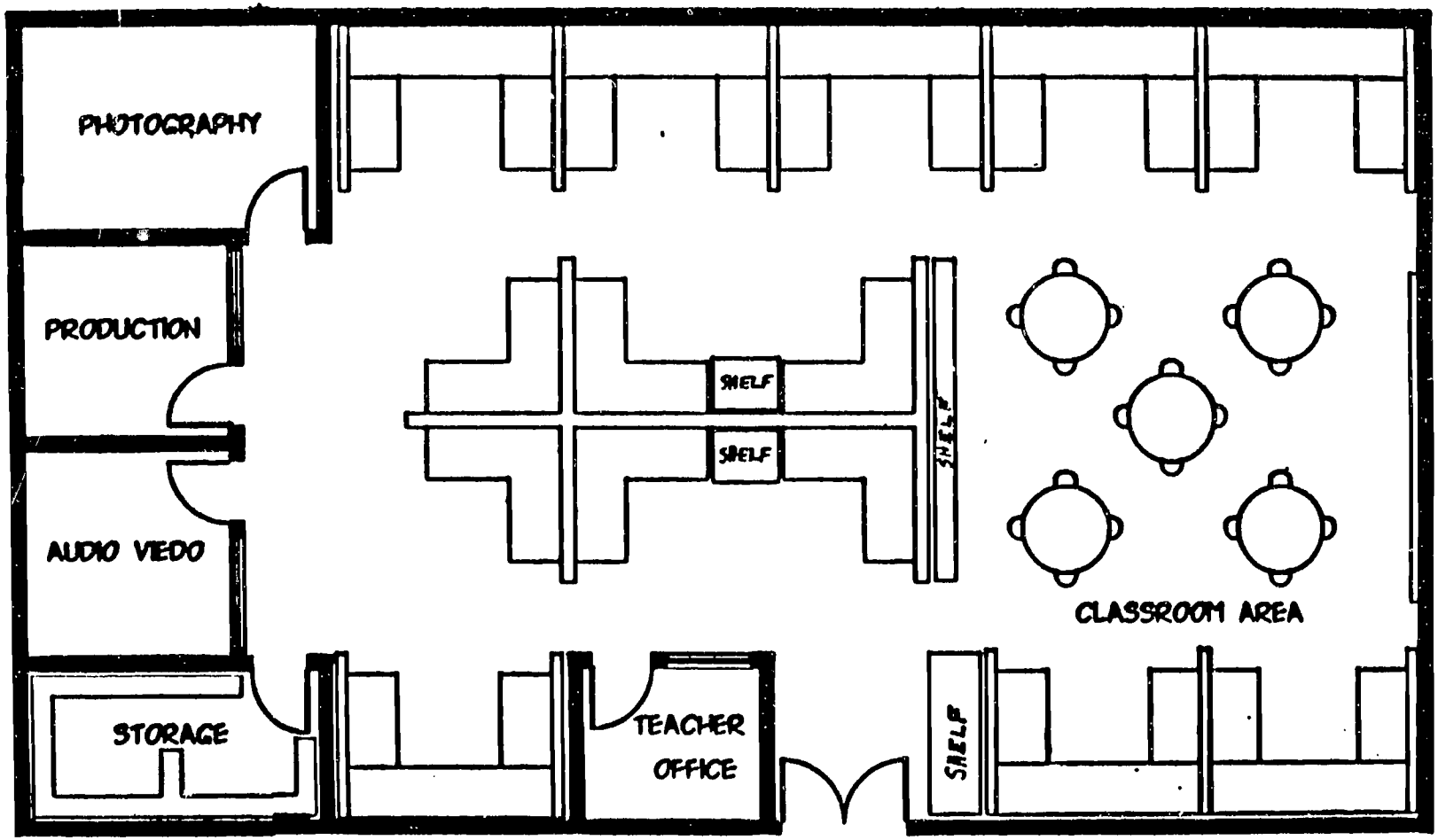
VIDEO
PRODUCTION
PHOTO
STORAGE
CLASSROOM AREA
TEACHER
OFFICE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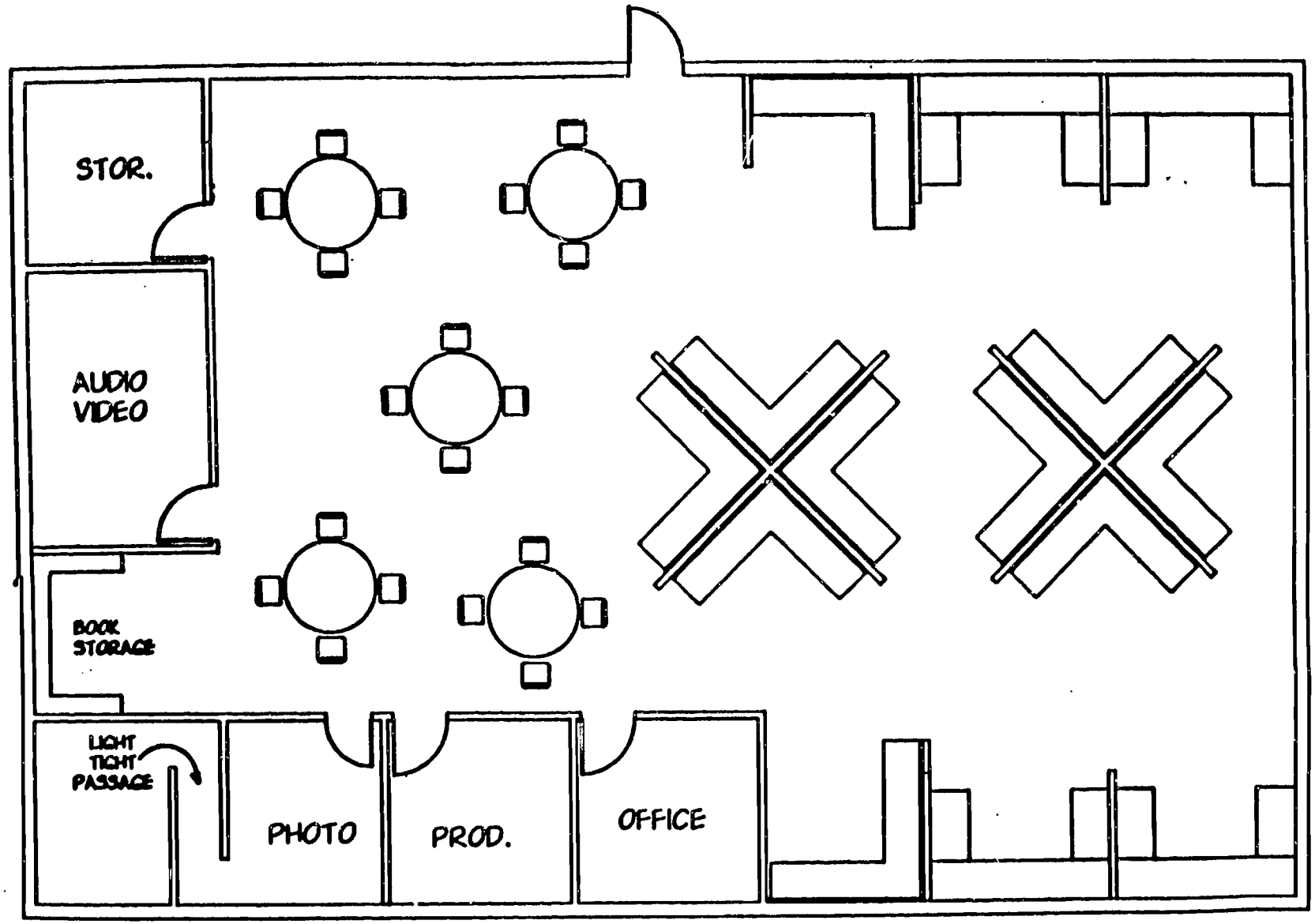
SHELF
SHELF
SHELF
CLASSROOM AREA


STOR.
AUDIO
VIDEO
BOOK
STORAGE
LIGHT
TIGHT
PASSAGE
PHOTO
PROD.
OFFICE

APPENDIX C

ADDITIONAL CURRICULUM INFORMATION