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ABSTRACT

These experimental curriculum materials, for one of five clusters developed for the occupational orientation program in Illinois, contain teacher references and a series of learning activity packages (LAPs) designed to acquaint the student with the wide range of occupational choices available in the industrial oriented occupations field. The 30 LAPs, each focusing on a different occupation are grouped under six categories: (1) Industrial Occupations (General), (2) Combined Metal Trades, (3) Construction Trades, (4) Electronics and Instrumentation, (5) Energy and Power, and (6) Graphic Communications. Each LAP identifies the category, the focus, the activity, and the objective. It lists the equipment, supplies, and forms needed, states the rationale, and describes the suggested procedure and alternate activities. The activities are designed to give students the opportunity to research, observe, and gain hands-on experience in representative jobs within the career field. This document also contains the Student Awareness/Attitude Inventory, and guidelines for developing pre-post assessment tests. Student forms (Field Trip Observation Form, Resource Person Information Sheet, Interview Questions, and Observation/Interview Form) and lists of 12 references and of 70 addresses for obtaining resources are appended. (HD)

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OCCUPATIONAL ORIENTATION

INDUSTRIAL ORIENTED OCCUPATIONS

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INDUSTRIAL ORIENTED OCCUPATIONS

Table of Contents

INTRODUCTION

The Industrial Oriented Occupations cluster is one of five clusters developed for the occupational orientation program in Illinois. The other four clusters are: Personal and Public Service Occupations; Health Occupations; Business, Marketing, and Management Occupations; and Applied Biological and Agricultural Occupations.

Each cluster consists of a series of learning activity packages (LAPs), teacher references, and career resources. The purpose of the LAPs is to acquaint students with the wide range of occupational choices available within each career cluster field. By participating in the activities, students are given the opportunity to research, observe, and gain hands-on experience in representative jobs within the career field.

Accompanying these cluster materials is the Teacher's Guide to Occupational Orientation. The guide provides an overview of the occupational orientation program in Illinois, suggestions to teachers for implementing a variety of instructional strategies contained in the cluster (field trips, simulations, use of resource persons, and in-class projects), and a Career Exploration Package on interviewing techniques which lays a basic foundation for the learning activity packages within each cluster. It is strongly recommended that teachers use the Teacher's Guide in conjunction with the teaching of the cluster.

Also included in the Teacher's Guide, and duplicated here, are 1) guidelines for developing pre-post assessment tests and 2) a Student Awareness/Attitude Inventory that can be administered at the beginning of the cluster course.

Guidelines for Developing Pre-Post Assessment Tests

Measuring student knowledge before, during, and after teaching the cluster materials is an important ingredient to the success of the occupational orientation program. Testing allows both the teacher and the student to know what material is going to be covered in one or more LAPs and also to know what material has and has not been learned upon the completion of the activity.

The learning activity packages contained in the cluster materials lend themselves particularly well to this kind of student evaluation. Since an integral part of each LAP is the LAP objective, tests can be developed to measure on a pre-post basis how well each student has mastered the skill or knowledge taught during the activity.

Tests that evaluate students in this way are called criterion-referenced tests. These tests are simply a measure of what the student knows or can do, given the conditions, performance, and

standards stated in the objective. Examples of situations in which pretests and posttests could be used effectively in the teaching of this cluster are:

- before and after a field trip to an airport
- before and after class presentations on labor organizations
- before and after the teaching of a series of LAPs on construction trades
- before and after the teaching of the entire cluster on Industrial Oriented Occupations

In each of these situations a pretest serves several useful purposes. Students are given an overview of the kinds of things that will be covered during the lesson or course and what they will be expected to know upon its conclusion. Teachers can discover, by examining the results of the pretests, areas in which students are strongest, as well as areas in which intensive instruction will be required.

By comparing the pretest results with those of the posttest, each student and the teacher learn which skills and knowledge have been mastered or not mastered for a single LAP, a series of related LAPs, or the entire course. Through the evaluation of pre- and posttest results, remediation activities can be planned, courses can be revised, and successful teaching strategies can be identified.

The procedures listed below are given here as an aid in developing tests in the Industrial Oriented Occupations cluster. The example given here deals with a single learning activity package; however, these same steps can be used for pre- and posttesting a series of related LAPs or for pre- and posttesting the entire cluster.

The teacher should also consult the series of Pre-Service Occupational Program (POP) Kits available from the Division of Adult, Vocational and Technical Education office in Springfield. Of particular importance are: Kit 3.1, Student Performance Objectives; Kit 3.3, Writing Sets of Objectives; Kit 5.1, Test Item Writing; and Kit 5.2, Student Performance Evaluation.

Develop one or more performance objectives based on a LAP objective. Every learning activity package in the cluster is preceded by a general learning objective, i.e. a statement of what the student should be able to do upon completion of the activity. The specific activity described in LAP 29, for example, is a class discussion with a commercial photographer. The objective for LAP 29 is: "At the conclusion of this lesson, the student will be able to describe in writing the type of work, location of work, required

education and training, salary range, advancement opportunities, and some advantages and disadvantages associated with a career in commercial photography."

This general learning objective can be broken down into several more specific performance objectives: 1) "Given a list of 10 job duties, the student will be able to select from the list the five job duties associated with the job of a commercial photographer," 2) "Given a list of four educational requirements for jobs, the student will be able to select the educational requirement of a commercial photographer," 3) "Given a scale of salary ranges, the student will be able to identify the salary scale of the commercial photographer," 4) "Given descriptions of advancement opportunities for four careers, the student will be able to select the description which fits the career in commercial photography," 5) "Given a randomized list of 10 advantages and 10 disadvantages associated with a career in commercial photography, the student will be able to identify eight of 10 advantages and eight of 10 disadvantages."

Notice that for each of the performance objectives, three components were presented: the conditions ("given a list" or "given a scale"), the performance required of the student ("will be able to select the educational requirement...") and the standard of performance required (selecting one description from a list of five). A well-written performance objective always contains these three components stated in concrete, measurable terms.

Rank the performance objectives by importance. Before writing test items, the relative importance of each of the performance objectives should be decided. For a single learning activity package this decision is usually not too difficult to make. In LAP 29, for example, you may decide that the performance objective dealing with the job duties of the commercial photographer is the most important, while the other five objectives are of lesser importance. When you are trying to decide the importance of 20 or 30 performance objectives for a series of 10 learning activity packages, this task may be more difficult. However, the time will be well spent since such pre-instruction decisions on a series of LAPs will assist planning for teaching skills and knowledge most important for students to learn.

Decide how much testing time is available or desirable. Since the amount of testing time determines, in large part, the length of the test, you must decide how much time is available or desirable for testing. Testing time could range from a short 5- to 10-minute period for a pretest before an electrician comes to speak to the class to a 30- or 40-minute period for a posttest following instruction on the seven LAPs on construction trades. When you have decided the amount of testing time, you should be able to estimate the number of test items to be written.

Develop one or more test items to measure each performance objective. The first consideration is the number of test items to be designed for each objective. Having decided, for example, that the job duties of the commercial photographer are the most important aspect of LAP 29, you will probably want to write a large proportion of the test items to measure that performance objective. A second consideration is the type or format of test item to select. For ease of administration and evaluation of results, it is advised that group-administerable, multiple-choice items be used. Written responses to questions or individually administered items are much more difficult to score and evaluate and require an excessive amount of testing time.

Administering the Student Awareness/Attitude Inventory

The student awareness/attitude inventory on the following pages should be given before instruction begins on any of the learning activity packages in the cluster. Two purposes are served by the inventory: 1) it can be used by the teacher to generate a general class discussion about careers and to establish a positive climate for occupational exploration in the Industrial Oriented Occupations field, and 2) it can serve as the basis for a personal career discussion between the student and his or her guidance counselor. Items 1-60 are specifically designed for general class discussion purposes and Items 61-102 are designed for career guidance discussions.

Through the combination of this inventory, other guidance activities, the cluster's learning activity packages, and the Career Exploration Package (see Teacher's Guide), it is hoped that the student will take responsibility for establishing his or her own career goals. The discussions which result from the administration of the inventory provide a useful starting point for identifying both awareness and attitudes in the occupational orientation program.

STUDENT AWARENESS/ATTITUDE INVENTORY

Name: _____

Directions: Listed below are a number of statements about work and choosing an occupation. Read each statement and decide whether you agree or disagree with it. Your answer should be as close as possible to what your true opinion is right now. There are no right or wrong answers. If you STRONGLY AGREE with the statement, circle SA; if you AGREE with the statement, circle A; if you are UNDECIDED, circle U; if you DISAGREE with the statement, circle D; and if you STRONGLY DISAGREE circle SD.

1	You have to know what you do well, and what you do not do well before you can choose an occupation.	SA	A	U	D	SD
2.	Ask others about their occupations, but make your own choice.	SA	A	U	D	SD
3.	It's unwise to choose an occupation until you have given it a lot of thought.	SA	A	U	D	SD
4.	Once you make an occupational choice, you can't make another one.	SA	A	U	D	SD
5.	In making an occupational choice, you need to know what kind of person you are.	SA	A	U	D	SD
6.	A person can do anything he or she wants as long as he or she tries hard.	SA	A	U	D	SD
7.	Your occupation is important because it determines how much you can earn.	SA	A	U	D	SD
8.	In choosing an occupation, it is more important to know what you do well than to know what you like to do.	SA	A	U	D	SD
9.	Plans which are indefinite now will become much clearer in the future.	SA	A	U	D	SD
10.	Your parents probably know better than anybody which occupation you should enter.	SA	A	U	D	SD
11.	Work is worthwhile mainly because it lets you buy the things you want.	SA	A	U	D	SD
12.	Work is drudgery.	SA	A	U	D	SD
13.	A person should not even try to decide upon an occupation because the future is so uncertain.	SA	A	U	D	SD
14.	It's probably just as easy to be successful in one occupation as it is in another.	SA	A	U	D	SD
15.	By the time you are 15 years old, you should have your mind pretty well made up about the occupation you intend to enter.	SA	A	U	D	SD

16.	There are so many things to consider in choosing an occupation, it is hard to make a decision.	SA	A	U	D	SD
17.	Sometimes you can't get into the occupation you want to enter.	SA	A	U	D	SD
18.	You can't go very far wrong by following your parent's advise about which occupation to enter.	SA	A	U	D	SD
19.	Working in an occupation is a lot like going to school.	SA	A	U	D	SD
20.	The best thing to do is to try out several occupations and then choose the one you like best.	SA	A	U	D	SD
21.	There is only one occupation for each individual.	SA	A	U	D	SD
22.	The most important consideration in choosing an occupation is whether or not you like it.	SA	A	U	D	SD
23.	Your interest in an occupation is not as important as whether you can do the work.	SA	A	U	D	SD
24.	You get into an occupation mostly by chance.	SA	A	U	D	SD
25.	It's who you know, not what you know, that's important in an occupation.	SA	A	U	D	SD
26.	You should choose an occupation which gives you a chance to help others.	SA	A	U	D	SD
27.	You should choose an occupation, then plan how to enter it.	SA	A	U	D	SD
28.	You should choose an occupation in which you can someday become famous.	SA	A	U	D	SD
29.	If you have some doubts about what you want to do, ask your parents or friends for advice and suggestions.	SA	A	U	D	SD
30.	Choose an occupation which allows you to do what you believe in.	SA	A	U	D	SD
31.	The most important part of work is the pleasure which comes from doing it.	SA	A	U	D	SD
32.	It doesn't matter which occupation you choose as long as it pays well.	SA	A	U	D	SD
33.	As far as choosing an occupation is concerned, something will come along sooner or later.	SA	A	U	D	SD
34.	I don't worry about choosing an occupation because I don't have anything to say about it anyway.	SA	A	U	D	SD
35.	The best occupation is one which is interesting.	SA	A	U	D	SD
36.	I really can't find any occupation that has much appeal to me.	SA	A	U	D	SD
37.	I have little or no idea of what working will be like.	SA	A	U	D	SD
38.	When I am trying to study, I often find myself daydreaming about what it will be like when I start working.	SA	A	U	D	SD

39.	If I go into the military, I think I'll wait to choose an occupation until I'm out.	SA	A	U	D	SD
40.	When it comes to choosing an occupation, I'll make up my own mind.	SA	A	U	D	SD
41.	I want to really accomplish something in my work—to make a great discovery or earn lots of money or help a great number of people.	SA	A	U	D	SD
42.	As long as I can remember, I've known what job I wanted to do.	SA	A	U	D	SD
43.	I can't understand how some people can be so set about what job they want to do.	SA	A	U	D	SD
44.	My occupation will have to be one which has short hours and nice working conditions.	SA	A	U	D	SD
45.	The occupation I choose has to give me plenty of freedom to do what I want.	SA	A	U	D	SD
46.	I want an occupation which pays a lot of money.	SA	A	U	D	SD
47.	I often wonder how successful I'll be in my occupation.	SA	A	U	D	SD
48.	I know which occupation I want to enter, but I have difficulty in preparing myself for it.	SA	A	U	D	SD
49.	I know very little about the requirements of occupations.	SA	A	U	D	SD
50.	I want to continue my schooling, but I don't know what courses to take or which occupations to choose.	SA	A	U	D	SD
51.	I spent a lot of time wishing I could do work that I know I cannot ever possibly do.	SA	A	U	D	SD
52.	I'm not going to worry about choosing an occupation until I'm out of school.	SA	A	U	D	SD
53.	If I can just help others in my work, I'll be happy.	SA	A	U	D	SD
54.	I guess everybody has to go to work sooner or later, but I don't look forward to it.	SA	A	U	D	SD
55.	I often daydream about what I want to be, but I really don't have an occupational choice.	SA	A	U	D	SD
56.	The greatest appeal of an occupation to me is the opportunity it provides for getting ahead.	SA	A	U	D	SD
57.	Everyone seems to tell me something different—until now I don't know which occupation to choose.	SA	A	U	D	SD
58.	I have a pretty good idea of the occupation I want to enter, but I don't know how to go about it.	SA	A	U	D	SD
59.	I plan to follow the occupation my parents suggest.	SA	A	U	D	SD
60.	I seldom think about the occupation I want to enter.	SA	A	U	D	SD

61.	A college degree is necessary for the kind of work I want to do.	SA A U D SD
62.	My father wants me to go to college.	SA A U D SD
63.	My mother wants me to go to college.	SA A U D SD
64.	I would be able to earn more money as a college graduate.	SA A U D SD
65.	I want to learn more about the careers I might enter.	SA A U D SD
66.	Marriage will help advance my career.	SA A U D SD
67.	I enjoy learning.	SA A U D SD
68.	My teachers think that I should go to college.	SA A U D SD
69.	I feel athletics should be an important part of my education.	SA A U D SD
70.	I'm influenced by many of my friends who are going to college.	SA A U D SD
71.	Social activities are very important to my career goals.	SA A U D SD
72.	I want to make good personal contacts for business or an occupation.	SA A U D SD
73.	A college education would not help me to do the things I am most interested in.	SA A U D SD
74.	I want to get a job and start earning a living as soon as possible.	SA A U D SD
75.	I need to start earning a living in order to support myself immediately.	SA A U D SD
76.	Continuing my formal education after high school would cost more than my parents could afford.	SA A U D SD
77.	Continuing my formal education after high school would cost more than my parents are willing to pay.	SA A U D SD
78.	My high school grades are too low to continue my education after high school.	SA A U D SD
79.	I don't like to study.	SA A U D SD
80.	I don't think I have the ability to continue my education after high school.	SA A U D SD
81.	It would cost more than it is worth to me to continue my education after high school.	SA A U D SD
82.	Earning a good income is important to me.	SA A U D SD
83.	Having job security and permanence is important to me.	SA A U D SD
84.	The work that I do should be important.	SA A U D SD
85.	I want the freedom to make my own decisions in my job.	SA A U D SD

86. In my job I should have the opportunity for promotion and advancement. SA A U D SD

87. Meeting and working with sociable, friendly people is important to me. SA A U D SD

88. If I could get better pay at another place, I would change jobs. SA A U D SD

89. If the work was not interesting enough, I would change jobs. SA A U D SD

90. If I could do more important work elsewhere, I would change jobs. SA A U D SD

91. If I had a poor supervisor, I would change jobs. SA A U D SD

92. If I didn't like my co-workers, I would change jobs. SA A U D SD

93. If I did not receive expected promotions or salary increases, I would change jobs. SA A U D SD

Directions: Read each question and circle the letter that answers the question for you.

94. Do you think you will quit high school before you graduate?

A. I will definitely leave.
B. I am likely to leave.
C. I don't know.
D. I am likely to stay.
E. I will definitely stay.

95. After you graduate from high school, what do you plan to do?

A. I will get a job.
B. I will go to vocational, technical, or business school.
C. I will go to junior college.
D. I will go to college.
E. I don't know.

96. If you go to college when do you plan to start?

A. right after high school.
B. after completing military service.
C. after I have worked for a few years.
D. my plans are not definite.
E. I definitely do not plan to attend college.

97. How much education do your parents or guardians want you to have?

A. They don't care whether I stay in school.
B. high school only
C. vocational school, business school, or junior college
D. college degree
E. I don't know.

98. How much education are most of your friends planning to obtain?

A. They are planning to quit high school.
B. They are planning to complete only high school.
C. They are planning to obtain vocational school, business school, or junior college training.
D. They are planning to obtain four-year college training.
E. I don't know.

99. How many different occupations have you seriously considered entering?

A. none
B. one
C. two
D. three
E. four or more

100. How definite is your present choice of an occupation?

A. I have made a definite choice.
B. I have made a likely choice.
C. I am undecided about my future occupation.

101. What grade were you in when you decided upon your present choice of an occupation?

A. I have not decided upon an occupation.
B. sixth grade or earlier
C. seventh or eighth grade
D. ninth grade
E. tenth grade

102. What three jobs would you like to have someday? Write your first, second, and third choice below.

_____

_____

_____

LEARNING ACTIVITY PACKAGE 1

Category: Industrial Occupations (General)

Focus: Introduction

Activity: Discussion/Student Pretest

Objective: At the conclusion of this lesson, the student will be able to identify key points to be considered about each occupation within the categories, and provide the instructor with information as to the types of activities in which the student is interested.

EQUIPMENT, SUPPLIES, AND FORMS

1. List of key points to be considered about each occupation.
2. Sample listing of occupations and categories (see sample in this learning package).
3. Pretest (see sample in this learning package).

RATIONALE

The purpose of this lesson is to introduce the students to the scope and organization of the industrial cluster.

SUGGESTED PROCEDURE

This lesson is to present the students with information about the industrial occupational cluster.

In a class discussion, present to the students the following points which provide basic information about the occupations studied:

Key Point	Descriptions
Nature of the work	Type of duties and skills performed, the methods and tools used to perform the duties and identification as an individual or team effort.
Places of employment	The geographical area(s) and the specific places in which an occupation is performed. May also include the numbers of men and women employed in an occupation.
Training, other qualifications and advancement	Education and/or skill development necessary for entry into an occupation. Any qualifications necessary for advancement or education to keep up-to-date with changes in the occupation.
Employment outlook	Indication of projected need for people in an occupation.
Earnings and working conditions	Typical salary or wages earned by those employed in an occupation. Types of environment which are generally found by those working the occupation.
Advantages and disadvantages	The generally accepted advantages and disadvantages of an occupation. This is a point which is relative to personal opinion.

Discuss the sample listing of occupations, keeping in mind that there are many other occupations in each category and that the categories are just a way to organize the occupations. It may be desirable to develop transparencies of the key points and the sample listing of occupations.

SAMPLE LISTING OF OCCUPATIONS

Energy and Power

Refrigeration Mechanic
Evaporative Cooler Installer
Refrigeration Unit Repair Person
Oil Burner Installer and Service Person
Furnace Installation and Repair Person
Ventilation (filtering and humidification) Worker
Installer of Equipment (fans, filters and humidifiers)
Electrical Appliance Repair Person
Small Appliance Repair Person
Gas Appliance Repair Person
Gas Service Person
Transmission Specialist
Tune-up Person
Motor Rebuilder
Diagnostic Analyzer
Automotive Technician
Ignition Specialist
Airplane Electrician
Flight Engineer
Diesel Mechanic
Fuel-Injection Service Person
Electrical Repair Person
Industrial Electrician
Powerhouse Electrician
Street Light Service Person
Lineman/woman
Cable Splicer
Line Repair Person
Electric Motor Repair Person
Electric Motor Winder
Electric Motor and Generator Tester
Refrigeration Engineer
Refrigeration Machine Operator
Outboard Motor Mechanic
Gasoline Engine Repair Person
Motorcycle Repair Person
Stationary Engineer
Power Plant Operator
Fireman/woman, High Pressure
Engineman/woman
Diesel Plant Operator
Substation Plant Operator
Hydro-Electric Plant Operator
Oil Pumper
Compressor Engineer
Pump Station Operator

SAMPLE LISTING OF OCCUPATIONS

Electronics and Instrumentation

Communications Person
Sound Technician
Equipment Installer
Instrument Mechanic
Audio-video Repair Person
Radio Repair Person
Television Repair and Service Person
Electronic Maintenance
Electro-Medical Equipment Repair Person
Gas Meter Repair Person
Instrument Worker
Thermostat Repair Person
Watch and Clock Repair Person
Watchmaker
Instrumentation Technician
Electrical Technician
Power and Load-Use Dispatcher
Electronic Maintenance Worker
Instrumentation and Controls Technician

Construction Trades

Bridge Builder
Rough Carpenter
Cabinet Maker
Maintenance Carpenter
Electrician
Maintenance Worker, Heavy Equipment
Construction Equipment Mechanic
Truck-Crane Operator
Bulldozer Operator
Drag Line Operator
Motor Grader Operator
Brick Layer
Stone Mason
Tile Setter
Painter
Paper Hanger
Plasterer
Stucco Mason
Plumber
Pipefitter
Sprinkler Fitter
Dry-Wall Applicator
Taper
Dry-Wall Sander

SAMPLE LISTING OF OCCUPATIONS

Construction Trades Cont'd.

Glazier
Glass Installer
Roofer
Corrugated Sheet Metal Sheeter
Carpet Layer
Ornamental Iron Worker
Millwright
Cement Mason

Combined Metal Trades

Molder
Furnace Operator
Cupola Tapper
Machinist
Patternmaker, Metal
Production Machine Operator
Gear Cutting Machine Operator
Centerless Grinder Operator
Screw Machine Operator
Kick Press Operator
Bending Machine Operator
Riveter, Hydraulic
Brake Operator (sheet metal)
Sheet Metal Layout Worker
Sheet Metal Worker
Gas Brazing Worker
Flame Cutter
Flame Cutting Machine Operator
Arc Welder
Spot Welder
Mig and Tig Welder
Repair Welder
Production Welder
Toolmaker
Tool and Die Maker
Die Finisher
Die Sinker
Edger
Metal Patternmaker
Patternmaking (foundry)
Fluoroscope Operator
Hardness Tester
Heat Treater

Graphic Communications

Airbrush Artist
Engrosser
Sign Painter
Interior Designer or Decorator
Display Designer
Industrial Designer
Ornamental Metalwork Designer
Furniture Designer
Photographic Laboratory and Darkroom Technician
Developer (film)
Photographic Retoucher
Copy Camera Operator
Architectural Draftsman/woman
Auto Body Designer
Detailer
Structural Designer
Specification Writer
Compositor
Job Printer
Cylinder Press Operator
Offset Press Operator
Engraving Press Operator
Plate Finisher
Photographer
Print Maker
Etcher
Photoengraver
Lithographer
Screen Maker
Silk Screen Machine Operator
Screen Painter
Book Serving Machine Operator
Spiral Binder
Folding Machine Operator

PRETEST

PART I

Instructions: Check the "Like" blank for those activities that you like to do. Check the "Dislike" blank for those activities that you do not like to do. Check the "Have Not Done" blank for those activities which you have never done.

	LIKE	DIS-LIKE	HAVE NOT DONE
Repair electrical appliances			
Work on cars			
Build things with your hands			
Drive a vehicle			
Take a course in woodworking			
Work in a laboratory			
Build models of cars or airplanes			
Work with erector set			
Solve math problems			
Take chemistry course			
Design buildings			
Play in band			
Draw or paint			
Attend plays			
Take an art course			
Write letters to your friends			
Attend religious services			
Go to a party			
Dance			
Go to sports events			

	LIKE	DIS-LIKE	HAVE NOT DONE
Talk about politics	____	____	____
Be an officer in a club	____	____	____
Lead a group	____	____	____
Sell people on an idea	____	____	____
Type materials for school	____	____	____
Keep your room neat and clean	____	____	____
Write business letters	____	____	____
Do mathematical work	____	____	____
Take a course in bookkeeping	____	____	____

PART II

Instructions: Express your present opinion of the following occupations by checking the appropriate blank.

1) I would definitely like to try working in this occupation.
2) I might like to try working in this occupation.
3) I don't think that I would like to work in this occupation.
4) I would never consider working in this occupation.
5) I do not know enough about this occupation to have an opinion.

	1	2	3	4	5
Engineer	___	___	___	___	___
Electronics Technician	___	___	___	___	___
Air Conditioning and Refrigeration Mechanic	___	___	___	___	___
Appliance Service Person	___	___	___	___	___
Automotive Body Repair Person	___	___	___	___	___
Automotive Mechanic	___	___	___	___	___
Air Traffic Controller	___	___	___	___	___

PRETEST (CONT'D.)

	1	2	3	4	5
Line Worker or Cable Splicer	___	___	___	___	___
Manufacturing Inspector	___	___	___	___	___
Carpenter	___	___	___	___	___
Electrician	___	___	___	___	___
Heavy Equipment Operator	___	___	___	___	___
Brick or Stone Mason	___	___	___	___	___
Plumber or Pipefitter	___	___	___	___	___
Plasterer	___	___	___	___	___
Glazier	___	___	___	___	___
Floor Covering Installer	___	___	___	___	___
Machinist	___	___	___	___	___
Welder	___	___	___	___	___
Architect	___	___	___	___	___
Foundry Worker	___	___	___	___	___
Commercial Photographer	___	___	___	___	___
Draftsman/woman	___	___	___	___	___
Graphic Artist	___	___	___	___	___
Sheet Metal Worker	___	___	___	___	___
Small Engine Mechanic	___	___	___	___	___
Radio and Television Service Person	___	___	___	___	___

LEARNING ACTIVITY PACKAGE 2

Category: Industrial Occupations (General)

Focus: Labor Organizations

Activity: Filmstrip/Debate

Objective: At the conclusion of this lesson, the student will be able to articulate the purposes and importance of labor organizations in an industrial society as evidenced by participation in class discussion and debate activities.

EQUIPMENT, SUPPLIES, AND FORMS

1. Filmstrip and Cassette tape, Labor Unions, Eye Gate House, 146-01 Archer Ave., Jamaica, NY 11435.

RATIONALE

The purpose of this activity is to introduce the student to the advantages and disadvantages of belonging to a labor union while working in an industrial occupation.

SUGGESTED PROCEDURE

Labor unions play an important part in our industrial society. The students should realize that the organized labor movement is a very substantial economic and political body in our society. Both major political parties are concerned with the support of organized labor, and considerable time is spent at both the federal and state levels on legislation directly affecting unions.

After viewing the filmstrip "Labor Unions," discuss the aims, purposes, advantages, and disadvantages of labor unions.

The use of a debate will help to stimulate interaction on this subject.

Divide the class into three groups, one group in favor of belonging to a labor organization, a second group against belonging to a labor organization, and the third group undecided. Allow the first two groups time to plan their arguments and strategies for convincing the students in the undecided group to join one side or the other. Arrange the groups so that the anti-union students are on one side of the room, the pro-union students are on the other side and those in the undecided group in the middle. The situation is similar to that of an industrial plant whose workers are divided on the question of becoming a "union shop," one in which all workers must belong to the union. The winner is that side which is able to obtain a majority of the votes or students for their side.

ALTERNATE ACTIVITIES

1. A panel of local union leaders representing a variety of unions may be asked to discuss such topics as: What contributions have union organizations made to the career or trade that you represent?
2. Assign students to interview workers and management personnel in a union shop about how the union benefits them.
3. Assign students to research the topic of strikes, emphasizing what a strike can accomplish for workers and what the workers must do to organize and support a successful strike.
4. Discuss the place of journeymen, apprentices, and a Joint Apprenticeship Training Committee (J.A.T.C.) within the union and management organization.

LEARNING ACTIVITY PACKAGE 3

Category: Combined Metal Trades

Focus: Foundry (Patternmaker, Molder, Coremaker)

Activity: Student Research/Student Demonstration

Objective: At the conclusion of this lesson, the student will be able to identify three foundry occupations.

EQUIPMENT, SUPPLIES, AND FORMS

1. Occupational Outlook Handbook.
2. Fishing sinker molds (sporting goods or hardware store).
3. Coffee can (1 to 3 lb.).
4. Hot plate or torch.
5. Lead pipe or ingots.
6. Hot pad or gloves.
7. Eye protection gear.

RATIONALE

The purpose of this lesson is to give students an idea of the skills needed for selected jobs in a casting foundry.

SUGGESTED PROCEDURE

Metal castings produced by foundry workers are essential for thousands of products ranging from missiles to cooking utensils.

In this activity the student is to research, using the Occupational Outlook Handbook, three of the key occupations in foundries, i.e., patternmaker, molder, and coremaker. This research can be done individually or in groups. The researcher should be looking for the following: nature of the work, education and training, employment outlook, earnings and working conditions. This information can then be put in chart form for display. The chart should show a correlation between advantages and disadvantages of each job within each category.

In order to simulate the work of a foundry, a demonstration of the metal casting process can be performed in the classroom. Using a fishing sinker mold (which is an example of a permanent mold), molten lead can be poured to form sinkers.

To cast the sinkers, melt a quantity of lead from lead pipe or ingots in a coffee can heated by a hot plate or propane torch. Pour the molten lead, about 630°F, into the mold. Allow the metal to cool before opening the mold to expose the newly made castings.

Caution should be taken when doing this demonstration. Be sure that the coffee can is free from any moisture before heating the lead, and wear gloves and eye protection in case of spilled or splattered metal.

ALTERNATE ACTIVITIES

1. A field trip to a foundry is very impressive in terms of the physical aspects of the job, the heat, noise, smell of hot metal, and movement of heavy molds and castings.
2. Assign students to collect samples of the materials used in a foundry.
3. Prepare a chart of the procedure for making castings.
4. Obtain samples of commercial castings as they come from the mold.

LEARNING ACTIVITY PACKAGE 4

Category: Combined Metal Trades

Focus: Sheet Metal Worker

Activity: Filmstrip/Student Exercise

Objective: At the conclusion of this lesson, the student will be able to identify, through participation in class discussion and completion of a student exercise, the principal tasks and skills required in the sheet-metal-working trades.

EQUIPMENT, SUPPLIES, AND FORMS

1. Filmstrip and Cassette tape, Sheet Metal Worker, Eye Gate House, 146-01 Archer Ave., Jamaica, NY 11435.

2. Sheet Metal Work, McKnight and McKnight Publishing Company, Bloomington, IL 61701.

RATIONALE

The purpose of this activity is to expose students to careers in the metal trades, especially in the sheet metal field.

SUGGESTED PROCEDURE

After viewing the filmstrip Sheet Metal Worker, discuss the daily tasks which have been outlined in terms of the various working conditions which one may face in this occupation. Correlate the tasks which are seen in the film with such subject areas as mathematics, the ability to make and read measurements, and drawing or drafting for laying out and developing patterns.

Assign each student an exercise in laying out and constructing a product which could be produced from sheet metal. The scoop project in Sheet Metal Work can help the student to identify the skills necessary to lay out and produce a product in sheet metal. The scoop can be easily laid out and constructed from heavy paper and fastened together with glue. If you want to have the students use metal, select a lightweight gauge which is easy to work with and which can be soldered or riveted easily.

Evaluate the exercise in terms of student demonstration of the use of mathematics and drawing skills in sheet metal work.

ALTERNATE ACTIVITIES

1. Conduct a field trip to a location where students can observe the design and construction of heating and ventilation ducts.
2. Using a simple floor plan, have the students determine the materials required and cost of prefabricated ducts for a heating system.

LEARNING ACTIVITY PACKAGE 5

Category: Combined Metal Trades

Focus: Welder

Activity: Equipment Display/Discussion

Objective: At the conclusion of this lesson, the student will be able to identify and orally describe the use of five different pieces of welding equipment.

EQUIPMENT, SUPPLIES, AND FORMS

1. Samples of gas- and arc-welding equipment.
2. Any welding text that describes the equipment and its use.
3. Occupational Outlook Handbook.

RATIONALE

The purpose of this lesson is to familiarize students with the type of equipment that a welder uses in his/her occupation.

SUGGESTED PROCEDURES

Collect a variety of welding equipment for the students to see and handle. This equipment may be obtained from your school shop or a welding supply house. Some examples of welding equipment that can be displayed are: electrode holders, welding helmet and goggles, welding gloves and other protective clothing, gas torch, cutting torch, filler rod, gas and electric hoses and cables, gas regulators, and any other items that you have access to or can take the students to see.

Using a welding text such as Modern Welding (Goodheart-Wilcox Company, Inc.) as a guide, name and describe the use of each piece of equipment to the students. Allow them to hold the equipment. If your situation allows, have the students strike an arc or light and adjust a gas torch.

While describing the use of each piece of equipment, also explain the nature of the work, salary ranges, training requirements, places of employment, and employment opportunities. The Occupational Outlook Handbook is a good source for this information.

ALTERNATE ACTIVITIES

1. Visit a welder on the job and observe the duties and working conditions.
2. Provide a welding demonstration and allow the students to use the tools of the welding trade.
3. View a film on welding methods and procedures.

LEARNING ACTIVITY PACKAGE 6

Category: Combined Metal Trades

Focus: Machining

Activity: Film/Discussion

Objective: At the conclusion of this lesson, the student will have knowledge of jobs in machining and be able to demonstrate their suitability for a career in machining by participation in the audience quiz that accompanies this film.

EQUIPMENT, SUPPLIES, AND FORMS

1. Film - Is a Career in Machining for You? On loan from: Illinois Office of Education, Media and Resources Center, 100 North First Street, Springfield, IL 62777.

RATIONALE

The purpose of this activity is to expose students to careers in the machining field.

SUGGESTED PROCEDURE

This film deals with the type of work performed by machinists, machine tool operators, tool and die makers, instrument makers, and set-up and layout people.

Have the class view the film, keeping in mind the following questions:

1. What are the six types of jobs in machining?
2. What traits and aptitudes should you have for working with machine tools?
3. Are workers in machining well paid?
4. What are the prospects for advancement?
5. In what industrial areas do you find people working in the machining occupations?
6. Which local companies employ people in the machining occupations?

At the conclusion of this film is an audience participation quiz which will help the student judge his/her suitability for a career in machining. Each student should participate in this quiz by answering on paper each question asked by the narrator.

Have the students answer the six questions listed above either in class discussion or on paper. If you choose the class discussion method, write the answers on the board so that all of the students will be aware of the answers.

ALTERNATE ACTIVITIES

1. Have a machine shop foreman/woman or other person working in machining discuss the local opportunities in machining, working conditions, and earnings.
2. Assign students to interview employers and workers in the machining field and report back to the class.

LEARNING ACTIVITY PACKAGE 7

Category: Construction Trades

Focus: Operating Engineer

Activity: Filmstrip/Discussion

Objective: At the conclusion of this lesson, the student will be able to identify the types of work performed and the heavy equipment used by a person working as an operating engineer.

EQUIPMENT, SUPPLIES, AND FORMS

1. Occupational Outlook Handbook.
2. Filmstrip and Cassette tape, The Heavy Equipment Operator, Society for Visual Education, Inc., 1343 Diversey Parkway, Chicago, IL 60614.

RATIONALE

The purpose of this lesson is to acquaint the students with some of the types of machinery operated and tasks performed by operating engineers.

SUGGESTED PROCEDURE

Operating engineers are people who work at the controls of such construction machinery as bulldozers, cranes, trench excavators, graders and other equipment. People in this craft have a wide range of skills and work with many different machines, some complex and others relatively simple.

Have the students view the filmstrip on the heavy equipment operator. Instruct the students to watch for the following items: types of equipment operated, tasks performed by individuals, and the degree of skill needed by the operators of various types of equipment. After viewing the filmstrip, discuss the above points. Using the Occupational Outlook Handbook as a guide, review with the students the recommended training and qualifications, earnings, and employment outlook for operating engineers. For more accurate information on wage rates in your area, contact local contractors or an office of the International Union of Operating Engineers.

ALTERNATE ACTIVITIES

1. The use of a resource person and/or a field trip may be of benefit in providing information for this occupational area. It would probably be necessary to schedule the resource person during an off or slow period of the construction season. The opposite would be true for a field trip.
2. Have students survey available schools and other training resources in the area to identify such factors as cost, time periods, placement prospects, labor union endorsement, and apprenticeship programs. Have students prepare written reports or present their findings orally to the class.

LEARNING ACTIVITY PACKAGE 8

Category: Construction Trades

Focus: Brick and Stone Masons

Activity: Filmstrip/Student Exercise

Objective: At the conclusion of this lesson, the student will be able to identify materials used and skills necessary for employment in the brick and stone masons trade.

EQUIPMENT, SUPPLIES, AND FORMS

1. Filmstrip and Cassette tape, The Brick Layer, Eye Gate House, 146-01 Archer Ave., Jamaica, NY 11435.

2. Masonry trowel, brick hammer, level, plywood for mud board, string line, bucket for mixing mortar, 25-30 common face bricks, plastic sheeting approximately 3' x 6', ready mix mortar or a mixture of lime and sand.

RATIONALE

This lesson provides students an opportunity to see the step-by-step procedures of this trade and to briefly experience working with the materials of the trade.

SUGGESTED PROCEDURE

Brick and stone masons build walls, partitions, fireplaces and other structures using masonry materials.

Show the filmstrip "The Brick Layer" to the students. This filmstrip illustrates the step-by-step procedures used by brick layers and includes narration which attempts to stimulate interest in this essential construction trade. Discussion of wages and training in the local area may follow the viewing or these topics may be assigned to the students for research.

As a class activity, construct a sample wall section using brick or stone and mortar. Use The World of Construction Laboratory Manual (McKnight and McKnight Publishing Company, Bloomington, IL 61701) as a reference, if needed. Construct the wall section laying 3 to 5 bricks each, checking the level and straightness of each course. The first course, or bottom layer, should be layed on a plastic sheet without mortar, to serve as a foundation. In the first, third and fifth courses, including the foundation course, the end bricks will need to be turned ninety degrees to the direction of the wall, or cut to permit staggering of joints. For the mortar joints, use ready-mix mortar prepared according to the directions on the bag, or a fifty-fifty mixture of lime and sand with water added for proper consistency. This mixture will not harden and can be saved. The joints should be about 3/8 inch in thickness. The wall may be dismantled and the bricks cleaned for reuse; if the wall is to be saved for display, use a piece of 3/4 inch plywood between the plastic sheet and bricks to serve as a platform. Wash all tools and equipment with water, but not over the drain.

ALTERNATE ACTIVITIES

1. Have a brick mason discuss the trade with the students and give a demonstration of the work.
2. Assign student research on the productivity of bricklayers today as compared to 50 years ago. Have them also investigate the evolution of brickmaking, materials and construction techniques used by assigning library research. (Local librarians can help students identify relevant information on the subject.)

LEARNING ACTIVITY PACKAGE 9

Category: Construction Trades

Focus: Carpenter

Activity: Film/Resource Person

Objective: At the conclusion of this lesson, the student will be able to describe the types of work encountered in the carpentry trade.

EQUIPMENT, SUPPLIES, AND FORMS

1. Film: Careers in Carpentry (available from most local offices of the United Brotherhood of Carpenters).
2. Resource Person Information Sheet (see sample in the back of this notebook).

RATIONALE

The purpose of this lesson is to introduce the students to the activities which an apprentice or journeyman carpenter may perform. It provides students with an opportunity to meet and talk with someone dealing directly with the trade and to gain information and exposure not normally available in the classroom.

SUGGESTED PROCEDURE

The film shows several types of work which may be encountered in the carpentry trade. Anyone working or wanting to work in the carpentry trade should be aware of the different types of work which include: welding, shipbuilding, housing construction, furniture building, bridge building, and cabinet work.

When obtaining the film from the local office of the United Brotherhood of Carpenters, obtain information on union training programs and entrance examination requirements for the carpenters union.

The resource person may be a business representative for the union, a working carpenter, general contractor or anyone affiliated with the trade. This person should be knowledgeable about benefits, working hours, pay scales, working conditions, and training required.

As a result of the interview and information gained from the film have the students complete the Job Information Sheet. This sheet can be handed in as evidence of the student's awareness of the occupation, or filed by the student for reference.

LEARNING ACTIVITY PACKAGE 10

Category: Construction Trades

Focus: Plumber and Pipefitter

Activity: Filmstrip/Student Exercise

Objective: At the conclusion of this lesson, the student will be able to identify tasks which a plumber or pipefitter is required to perform and will have experienced representative tasks as assigned by the instructor.

EQUIPMENT, SUPPLIES, AND FORMS

1. Filmstrip and Cassette tape, The Plumber, Eye Gate House, 146-01 Archer Ave., Jamaica, NY 11435.

2. Various plumbing supplies and tools, copper tubing and fittings, galvanized pipe, plastic pipe and fittings, pipe and tubing cutter, pipe threading equipment, torch, flux, solder, plastic pipe cement.

RATIONALE

The purpose of this lesson is to provide students with an opportunity to see some of the tasks which plumbers and pipefitters perform and to allow the student to experience some of these in the classroom.

SUGGESTED PROCEDURE

Viewing the suggested filmstrip will allow the students to see step-by-step procedures and tasks related to the plumbing and pipefitters trade. The Occupational Outlook Handbook may be used as a guide for the discussion of salaries, wages, education, and training, or a union representative can provide this information for the local area.

For the student to experience some of the basic tasks of this trade the following activities should be completed:

1. Cutting, assembling, and soldering copper tubing and fittings.
2. Cutting, threading, and assembling galvanized pipe and fittings.
3. Cutting, assembling, and cementing plastic pipe.

The completion of these activities allows the student to perform basically the same task, that of joining together pipe or tubing and fittings, using different methods and materials. The plumber or pipefitter often uses these materials and methods in the performance of the job.

ALTERNATE ACTIVITIES

1. Assign student research and examination of the plumbing code for the local area, comparing it with that of a nearby community or state.
2. Have the students examine types of plumbing materials, determining the advantages and disadvantages of each, where they are used, and for what purpose they are used.
3. Utilizing the information acquired in the above activities, design a plumbing blueprint for a "model" home or a class project. Divide the class into work groups, if necessary, to assure full participation and discussion of the factors to be considered in designing plumbing systems.

LEARNING ACTIVITY PACKAGE 11

Category: Construction Trades

Focus: Electrician

Activity: Discussion/Student Exercise

Objective: At the conclusion of this lesson, the student will be able to identify the nature of work performed by electricians, the type of training generally needed for this trade, and some of the tools and materials used in the trade.

EQUIPMENT, SUPPLIES, AND FORMS

1. An assortment of wiring devices, outlets, switches, lampholders, circuit breakers and panels, E.M.T. fittings, conduit, outlet boxes and various types and sizes of wire used in residential wiring.
2. Screwdrivers, wire strippers, pliers, hacksaw, conduit bender, and test meter.
3. Occupational Outlook Handbook.

RATIONALE

This activity allows the students an opportunity to work with some of the tools and wiring devices that an electrician uses in the trade.

SUGGESTED PROCEDURE

Obtain various wiring devices and electrical materials that students can use to wire outlets, switches, and lampholders. Have each student perform one or more of the following activities: Properly attach a length of #12 or #14 gauge wire to a switch, outlet or lampholder; properly wire and install a circuit breaker in its panel; properly bend a section of conduit; assemble E.M.T. fittings and mount a switch or outlet box to the conduit. Each of the activities can be combined to make a simple circuit which includes circuit-breaker panel, wire run in conduit and connected to a box mounted switch, lampholder and outlet. If properly wired, this circuit can be tested for operation by connecting it to a 120-volt power supply. Items in this activity which can be considered consumable and will need to be replaced are the wire and conduit.

This activity can be improved upon by constructing a 2" x 4" stud wall section and mounting the wiring in the wall section.

Discuss with the students, using the Occupational Outlook Handbook or information from a local union representative, the type of education and training necessary to enter the trade and how this training can be obtained in the local setting. A union representative should also be able to supply information on local wages, where electricians are working in the area, and the expected worker demand in the local area.

ALTERNATE ACTIVITIES

1. Visit an electrician on the job to view the procedures which are used.
2. Arrange for an electrician as a resource person and have this person demonstrate the above wiring exercise.
3. Assign the students to work in groups to design wiring plans for a theoretical kitchen with switches, lampholders, wall outlets, utility supply sources, and routing to an overall power supply source and circuit breaker panel.

LEARNING ACTIVITY PACKAGE 12

Category: Construction Trades

Focus: Floor-Covering Installer

Activity: Display/Demonstration/Discussion

Objective: At the conclusion of this lesson, the student will be able to identify the tools and methods used by floor-covering installers.

EQUIPMENT, SUPPLIES, AND FORMS

1. Assortment of tools and equipment used in this occupation.
2. Samples of various types of floor coverings.
3. Occupational Outlook Handbook.

RATIONALE

The purpose of this lesson is to provide the students with an opportunity to become aware of the occupation of floor-covering installer by viewing and handling the tools and materials used.

SUGGESTED PROCEDURE

Floor-covering installers (also called floor-covering mechanics and floor layers) install, replace, and repair floor coverings such as resilient tile, linoleum, vinyl sheets, and carpeting.

Obtain an assortment of tools and equipment which are used in installing floor coverings. These should include knives, seam rollers, measuring tape, carpet stretcher, adhesives, carpet tape, tackless strips and any other tools which can be obtained. Tools may be borrowed from a company or person involved in the occupation or may be rented. The tools should be displayed and described in the classroom.

Obtain samples of various floor coverings, some of which are large enough to be used in the demonstration of laying floor covering. Each of the samples should represent a different type of floor covering, not just a different color or style. The samples should be of various carpet types and fibers, resilient coverings, linoleum, tile, vinyl, and specialty coverings like cork. Allow the students to examine the samples and explain to them where each type might be used. Demonstrate to the students, using some of the sample coverings, the methods and procedures used for installation. For help, contact a local floor-covering outlet.

Using the Occupational Outlook Handbook as a guide, discuss the information on this occupational area.

ALTERNATE ACTIVITIES

1. Have the students lay floor coverings, using proper methods, on a floor plan of a house that has been drawn on plywood or heavy cardboard. The covering used should be representative of coverings generally used in each room.
2. Show a film on the do-it-yourself aspects of floor-covering installation.
3. Have the students research and list possible employers of floor covering installers using the yellow pages of the telephone directory.

LEARNING ACTIVITY PACKAGE 13

Category: Construction Trades

Focus: Painter and Paperhanger

Activity: Resource Person/Demonstration

Objective: At the conclusion of this lesson, the student will be able to describe the skills utilized and methods employed in the trade.

EQUIPMENT, SUPPLIES, AND FORMS

1. Rolls of wallpaper or other wall covering and suitable poster or adhesive.
2. Sheet of 1/2-inch wallboard or other surface to be papered.
3. Resource Person Information Sheet (see sample in the back of this notebook).

RATIONALE

The purpose of this activity is to give the students an opportunity to talk with a painter or paperhanger about the job and to watch a demonstration of the skills involved in hanging wallcoverings.

SUGGESTED PROCEDURE

Obtain as a resource person someone who is involved in both painting and paperhanging. This person should be willing to provide a classroom demonstration of the skills and methods used in the hanging of wallcoverings.

Have the students prepare in advance several questions to ask the resource person. This will speed up the interview and allow time for the demonstration. The students should complete the Job Information Sheet at another time rather than take time away from the demonstration.

The demonstration is presented by having the resource person hang wallpaper or another wallcovering in the classroom. The person should describe what is being done and why. The wallcovering should be obtained by the instructor, with adhesive suitable for the type of covering to be used. Do not expect the resource person to supply anything more than the tools that will be used to hang the wallcovering. Rolls of wallcovering which have outdated patterns, incorrect color, or are damaged can usually be obtained for little or no cost from paint and wallpaper stores. The area to be covered may be a smooth surface and should be at least 8 feet high and 4 feet wide. A sheet of 1/2-inch wallboard mounted in a vertical position makes an ideal surface for this activity.

ALTERNATE ACTIVITIES

1. Have the resource person discuss and demonstrate the types of tools, brushes, rollers and spray(s) used to apply finishes, and the solvents used with these finishes.
2. Show a film on various types of finishes available and their uses and conduct a class discussion on the film's content, stressing the importance of different types of finishes for different purposes. Attention should also be paid to such factors as cost, availability of material, and durability of various types of finishes.
3. Have the students research and list possible employers of painters and paperhangers in the area, using the yellow pages of the local telephone directory.

LEARNING ACTIVITY PACKAGE 14

Category: Electronics and Instrumentation

Focus: Technician (Electronics)

Activity: Film/Discussion

Objective: At the conclusion of this lesson, the student will be able to describe what technicians do and the highly specialized nature of their occupation.

EQUIPMENT, SUPPLIES, AND FORMS

1. Film - Is A Career As A Technician For You? Available on loan from: Illinois Office of Education, Media and Resources Center, 100 North First Street, Springfield, IL 62777.

RATIONALE

The purpose of this activity is to acquaint the students with the occupational area of technician, and by example of the electronics technician, to emphasize the specialization of the occupation.

SUGGESTED PROCEDURE

Electronics technicians develop, manufacture and service a wide range of electronic equipment and systems. They may work with radio, radar, sonar, television, and other communications equipment; industrial and medical measuring or control devices; navigational equipment; electronic computers, and many other types of electronic equipment.

View the film with the students. It explains the occupation of technician, explores the wide range of settings in which technicians work, and describes the characteristics of persons successful in the field. Included in the film is an audience participation quiz through which the students can judge themselves in relationship to the occupation.

After viewing the film have the students discuss or answer in writing the following questions:

What is a technician?
What kinds of tasks does a technician perform?
What is the relationship between a technician to an engineer or scientist?
Are technicians well paid?
What traits, aptitudes, and work preferences should you have to become a technician?
What are the employment opportunities in this field? What are the prospects for the future?
Where are technicians needed in the United States?

Assign the students to research specialty areas of the electronics technician. Three possible areas for research would be communications, medicine, and computers.

ALTERNATE ACTIVITIES

1. Assign a student committee to prepare a list of technical training programs in the area.
2. Determine which local companies employ technicians and what the entrance requirements are in terms of education and training.

LEARNING ACTIVITY PACKAGE 15

Category: Electronics and Instrumentation

Focus: Electronics Assembly and Related Manufacturing

Activity: Film/Discussion

Objective: At the conclusion of this lesson, the student will be able to name specific occupations in electronics manufacturing as well as the education and training needed for these occupations.

EQUIPMENT, SUPPLIES, AND FORMS

1. Film - Is A Career In Electronics Manufacturing For You? Available on loan from: Illinois Office of Education, Media and Resources Center, 100 North First Street, Springfield, IL 62777.
2. Printed circuit boards with mounted components (can be obtained from discarded transistor radio).
3. Soldering iron and solder.

RATIONALE

The purpose of this lesson is to inform the students of occupations in electronic manufacturing and the education or training necessary for employment in some of those positions.

SUGGESTED PROCEDURE

Electronic products have become an important part of our daily business and general living. The astronaut, doctor, and business person all have something in common: without electronic devices they would be unable to do their work.

The electronics manufacturing industry is comprised of four main market areas: government products, industrial products, consumer products, and components. The film "Is a Career in Electronics Manufacturing for You?" highlights the men and women in plant jobs as well as the professional people and clerical workers of the industry.

View the film with the students and discuss the following questions: How important is the electronics manufacturing industry? What jobs are performed? What are some of the specific occupations in the plant? What education and/or training do you need for a plant job in electronics manufacturing? For a job as engineer or scientist?

What are the definitions of these terms: assembler, miniaturize, fabricating, components, apprentice, circuit, and dexterity.

Using the printed circuit boards with mounted components, have the students unsolder and remove the components. Label the location of each component. Inspect the section of circuit board that the components were removed from, noting how each component completes a part of the circuit and how the copper foil takes the place of individual wires. The students are then to reassemble and solder the components in place as a worker in the plant would do.

ALTERNATE ACTIVITIES

1. Have the students conduct research on new jobs in electronics manufacturing that have been created through recent technological advances.
2. Assemble, as a student project, a simple electronics kit of the student's choice.

LEARNING ACTIVITY PACKAGE 16

Category: Electronics and Instrumentation

Focus: Radio and Television Service Technician

Activity: Filmstrip/Student Exercise

Objective: At the conclusion of this lesson, the student will be able to identify everyday tasks that the radio and television service technician performs.

EQUIPMENT, SUPPLIES, AND FORMS

1. Filmstrip and Cassette tape, TV and Radio Repair, Eye Gate House, 146-01 Archer Ave., Jamaica, NY 11435.
2. Assortment of resistors, which includes two 1000 ohm (1K) and one 100 ohm resistors for each student or group performing the exercise.
3. Soldering iron and solder.
4. Volt-Ohm-Milliamp Multimeter.
5. Occupational Outlook Handbook.
6. Reference: Electronics in Action, 2nd ed., Delpit and Johnson; Bennett Co., Inc., Peoria, IL 61614.

RATIONALE

The purpose of this activity is to expose students to careers in the radio and television repair field. It provides the students with an opportunity to see from the filmstrip how the worker goes about everyday tasks. The lesson is designed to allow students to experience some of the simple tasks involved in the occupation.

SUGGESTED PROCEDURE

View the filmstrip with the students. Discuss the occupation, using the Occupational Outlook Handbook as a guide, in terms of employment outlook, earnings, working conditions, and any other questions which may be raised by the students.

The exercise allows the students to experience the following tasks which a service technician may be called on to perform: identify resistance values by color code, identify series, parallel-series, and parallel circuits. The resources listed will be of help in performing these tasks if you are not familiar with them. The suggested pages for study are pages 33-43, 45, 46, and 60-62 in Electronics in Action, 2nd edition.

Have the students do the following: using the color code, list the resistance value of several resistors selected by the instructor. (Included in the selection should be the 1000 ohm and 100 ohm resistors that are to be used in the series and parallel circuits.) After the students have identified the resistance values they are to select three resistors, two of 1000 ohm value and one of 100 ohm value and measure with the V.O.M. the resistance of each resistor. (These three resistors will be used in the construction of series and parallel circuits.) Using two 1000 ohm and one 100 ohm resistors, the students should construct, by soldering together the resistors, a series circuit, measuring the total resistance of the circuit. Disassemble the series circuit and, using the same resistors, construct a parallel circuit. Measure the total resistance of this circuit. Compare the total resistances. The measured resistance of the series should be 2200 ohms, and the parallel 83.33 ohm.

ALTERNATE ACTIVITIES

1. Have the students survey the local area to determine the range of employment in this occupational area. The students should identify the number of self-employed technicians, the number who work in shops and stores that sell and service electronic products, and the number who are employed by manufacturers.
2. Identify service technician's training that is available from manufacturers, employers, trade associations, vocational and technical schools and correspondence schools.

LEARNING ACTIVITY PACKAGE 17

Category: Energy and Power

Focus: Automotive Mechanic

Activity: Filmstrip/Student Exercise

Objective: At the conclusion of this lesson, the student will be able to describe tasks performed by auto mechanics, and the recommendations and requirements for entry-level employment in the area.

EQUIPMENT, SUPPLIES, AND FORMS

1. Filmstrip and Cassette tape, Automobile Mechanic, Eye Gate House, 146-01 Archer Ave., Jamaica, NY 11435.

2. Entry-Level Employment Requirements Form (see sample enclosed in this learning package).

RATIONALE

The purpose of this activity is to acquaint students with the types of tasks which an automobile mechanic performs so that they can determine requirements of local employers for entry-level employment.

SUGGESTED PROCEDURE

The filmstrip and cassette tape titled Automobile Mechanic is designed to show how workers in this occupation go about their everyday tasks. View the filmstrip with the students, discussing afterwards the potential for employment in the local area. Be sure to include dealerships, privately owned garages, specialty shops such as automatic transmission, ignition or carburetion, service stations, part-time private repair shops, and chain store automotive centers.

Ask the students, either in groups or individually, to find out what is required of a person for entry-level employment as a mechanic in each of these establishments. The students may obtain this information by interviewing owners, managers, personnel department heads, or by writing letters of inquiry to these people. Have each student or group complete the Entry-level Employment Requirements form for each business from which information is obtained. The results of this survey can be charted for ease of determining entry requirements in each type of establishment.

Determine which businesses are members of the Illinois Garage Owners Association or similar organizations and see if their requirements are different from nonmembers requirements.

ALTERNATE ACTIVITIES

1. Invite a resource person or panel of resource people to discuss the types of mechanical work done in their shops.
2. Investigate the investment in tools and equipment needed by a person who is starting in this occupation.
3. Invite a resource person in consumer advocacy to discuss traditional problem areas and recent advances in legal safeguards in the field of automobile repair. The resource person might be from a city or state consumer protection agency, the local Better Business Bureau, or the local Legal Aid organization.

ENTRY-LEVEL EMPLOYMENT REQUIREMENTS

1. Name of Business _____

2. Position _____

3. To obtain entry level employment in this position the following skills are required or recommended:

Education and Training.

Personal Requirements and Desirable Traits.

Other.

by _____ Position or Title _____
Name

LEARNING ACTIVITY PACKAGE 18

Category: Energy and Power

Focus: Small Engine Mechanic

Activity: [illegible] Person

Objective: At the conclusion of this lesson, the student will be able to identify the many types of machines that a small engine mechanic could be expected to work on and the type of training sponsored by manufacturers and importers of these machines.

EQUIPMENT, SUPPLIES, AND FORMS

1. Resource Person Information Sheet (see sample in the back of this notebook).

RATIONALE

The purpose of this lesson is to help students identify the types of machines that have small gasoline engines and associated components that require the services of mechanics, and to inform the student of factory-sponsored training schools or sessions which are available to them.

SUGGESTED PROCEDURE

With the increase in the amount of leisure time, there is a great demand for people skilled in setting up, repairing, and maintaining boat motors, snowmobiles, motorcycles, chain saws, and other pieces of equipment powered by small engines.

Select a resource person who is familiar with the variety of applications for small gasoline engines and the need for qualified mechanics to work on this equipment. In selecting this person try to obtain someone who is acquainted with factory recommended servicing techniques, procedures, and training. This person may be a dealer, or work for a dealer, handling several lines of small gasoline engine powered equipment. A factory representative would be a good choice. Be sure to ask the person to identify for the students the many possibilities for working with small engines, and the type of factory training that is usually available through dealerships or at the place of employment.

The students also should be instructed to interview the resource person for information on wages and salaries paid to people working on small engines, seasonal aspects, if any, in this line of work, and types of tools and equipment needed for the occupation.

If the resource person is not knowledgeable about factory training schools, the students can write to manufacturers requesting this information.

ALTERNATE ACTIVITIES

1. Take a field trip to a dealership of motorcycles, boat motors, and similar equipment and observe the mechanics at work.
2. Have the students disassemble and inspect a small gasoline engine.
3. View training films or other visuals available from manufacturers on the repair and maintenance of their products.

LEARNING ACTIVITY PACKAGE 19

Category: Energy and Power

Focus: Air Traffic Controller

Activity: Filmstrip and Simulation Game

Objective: At the conclusion of this lesson, the student will demonstrate in a simulated game situation awareness of the duties and mental stress of an air traffic controller.

EQUIPMENT, SUPPLIES, AND FORMS

1. Filmstrip and Cassette tape, Control Tower Operators, Eye Gate House, 146-01 Archer Ave., Jamaica, NY 11435.
2. Time piece with a second hand.
3. Air Traffic Controller Simulation Game (see sample enclosed in this learning package).

RATIONALE

The purpose of this exercise is to acquaint the students with the duties of an air traffic controller and to demonstrate to the students the mental stress experienced in this occupation.

SUGGESTED PROCEDURE

Air traffic controllers are the guardians of the airways. They coordinate flights to prevent accidents and minimize delays in takeoffs and landings. Some regulate airport traffic; others regulate flights between airports.

View the filmstrip Control Tower Operators, which is made up of actual photographs taken on the job. This will provide students with a visual overview of the job as well as some insight into attitudes needed for this job.

The air traffic controller game simulates, in the classroom, a flight situation which could easily be faced by an air traffic controller on the job. The game assumes that four aircraft at four different altitudes are preparing to land. The students are to add and subtract the four altitudes as they are read at five-second intervals and arrive at a final altitude from which each airplane will make an approach and landing.

ALTERNATE ACTIVITIES

1. Obtain an air-band radio receiver and monitor the control tower-to-aircraft communications from a nearby airport. If you cannot receive air communications at school, record a portion of a tower-to-aircraft conversation for replay in the classroom.
2. A suggested reading for classroom use or for individual students who are interested in this occupational area is Eye on the Sky: How Aircraft Controllers Work, Creighton Peet, Macrae Smith Company, Philadelphia, PA.

AIR TRAFFIC CONTROLLER SIMULATION GAME

Directions:

1. Head four columns on a sheet of paper with the following numbers: 100, 200, 300, and 400. These numbers represent aircraft at various altitudes.
2. Have four students at the front of the room read the operations (i.e., plus twenty, minus ten) at five-second intervals. The class is to add or subtract the numbers from the base altitude to get the flight altitude.
3. If all operations are performed according to directions and conclude with the number indicated for all four columns, you have landed all four planes safely.
4. The operations should first be given in numerical order, according to sample columns.
5. A final altitude higher than that at the bottom of the column would indicate that the aircraft had not landed and an altitude lower than that at the bottom of the column would represent a crash landing.
6. For a variation of this game, give the column operations in a different order or substitute new numbers.

SAMPLE OPERATIONS

100	200	300	400
+20	-3	+30	+60
-50	+3	-10	-100
-10	-100	-50	+3
+30	+60	+20	-3
+60	+30	+60	+30
-100	-10	-100	-10
+3	-50	+3	-50
-3	+20	-3	+20
50	150	250	350

Mount each sample operation on a 3" x 5" card.

LEARNING ACTIVITY PACKAGE 20

Category: Energy and Power

Focus: Airframe and Powerplant Mechanic

Activity: Field Trip to Airport

Objective: At the conclusion of this lesson, the student will be able to describe in writing the job responsibilities, environment, and tools related to the airframe and powerplant mechanic operations.

EQUIPMENT, SUPPLIES, AND FORMS

1. Field Trip Observation Form (see sample in the back of this notebook).

RATIONALE

The purpose of this activity is to expose students to careers in the field of airframe and powerplant mechanics. It provides students with an opportunity to meet and talk with someone dealing directly with the job and to gain information and exposure not normally available in the classroom.

SUGGESTED PROCEDURE

Aircraft mechanics keep complicated jet aircraft as well as small aircraft in good operating condition. Skilled mechanics perform preventive maintenance and make repairs. Inspections required by the Federal Aviation Administration (FAA) are made by FAA-licensed airframe and powerplant mechanics.

A field trip to the work site allows students to see aircraft in various stages of repair and maintenance. The cleanliness of the environment in which an airframe and powerplant mechanic works as compared to that of most automobile mechanics is impressive.

The field trip should be scheduled to an airport with at least one licensed airframe or powerplant mechanic. Most airports will have a qualified mechanic to perform routine maintenance. The visit should include the following observations: powerplant repair and inspection; airframe repair, maintenance and inspection; avionics; service; and maintenance. Be sure that there is time for the students to interview and talk with the mechanics about how and where they obtained their training, what is required for licensing by the FAA, the range of possibilities for employment in this field, and the earning power of a licensed airframe and powerplant mechanic.

ALTERNATE ACTIVITIES

1. Have the students research schools offering occupational training in aviation maintenance, including the armed services.
2. Visit a school or other facility training A.F.P. mechanics.
3. Show the Filmstrips and Cassette tapes, Jet Engine Mechanics, Aircraft Maintenance Mechanic, Eye Gate House, 146-01 Archer Ave., Jamaica, NY 11435.
4. Have students research other occupations of the aviation aerospace industry.

LEARNING ACTIVITY PACKAGE 21

Category: Energy and Power

Focus: Air Conditioning and Refrigeration Mechanic

Activity: Resource Person

Objective: At the conclusion of this lesson, the student will be able to demonstrate knowledge of the occupation of air conditioning and refrigeration mechanics by participating in the classroom interview of a resource person and completing an information sheet based on the interview.

EQUIPMENT, SUPPLIES, AND FORMS

1. Resource Person Information Sheet (see sample in the back of this notebook).

RATIONALE

The purpose of this lesson is to acquaint students with the occupation of air conditioning and refrigeration mechanic. It provides students with an opportunity to meet and talk with someone dealing directly with the job and gain information and exposure not normally available in the classroom.

SUGGESTED PROCEDURE

A resource person is recommended for presenting this occupational area because of the difficulty of simulating work tasks and duties in the area without skills or training.

Select as the resource person someone who is acquainted with both air conditioning and refrigeration. This person should be informed in advance of the objective of the lesson and be prepared to discuss the location and conditions under which the work is done, benefits, working hours, pay scales, and training required. The resource person should be encouraged to discuss personal aspects of his or her career. Be sure that time is allowed for students to ask any additional questions that they may have.

ALTERNATE ACTIVITIES

1. Have the resource person demonstrate methods used to diagnose and make repairs on the school's air conditioning system or refrigeration appliances.
2. Display tools and equipment used in the occupation.

LEARNING ACTIVITY PACKAGE 22

Category: Energy and Power

Focus: Lineman/woman and Cable Splicer

Activity: Class Discussion, Display, and Student Exercise

Objective: At the conclusion of this lesson, the student will be able to identify the type of materials used and discuss the manual dexterity required of linemen/women and cable splicers.

EQUIPMENT, SUPPLIES, AND FORMS

1. Samples of the types of cable used by telephone companies.
2. Quantity of multi-strand cable used for telephone installation in the home. Minimum of 20 inches per student.
3. Wire strippers.

RATIONALE

The purpose of this activity is to acquaint the students with the occupations of lineman/woman and cable splicer by familiarizing them with the types of cable and methods of splicing used by these people in their daily work.

SUGGESTED PROCEDURE

The vast network of wires and cables that connect telephone central offices to each other and to customers' telephones and switchboards are constructed and maintained by linemen/women and cable splicers.

In this lesson the students are to be made aware of the linemen/women and cable splicers' job by having an opportunity to inspect and work with the basic material of the occupation.

Obtain and display as many different types of cable as can be collected from the local telephone company. This should include wire which is used underground as well as on poles, in the central office, in buildings, and homes. Also obtain enough small gauge wire, such as is used for home telephone installation, for each student to be able to complete a splice of the type used by the phone company. It will be necessary to inquire at the local phone company about the types of splices used and how these are executed. This information can then be passed on to the students in the form of the cable or wire splicing exercise.

Discuss with the students the nature of the work, the training and how it may be acquired, the prevailing wage rate for the area, and the working conditions for these jobs. Be sure to stress the outdoor working conditions, climbing, weather, irregular hours and physical demands of the work. Information of this type can be obtained from the telephone company or the Occupational Outlook Handbook.

ALTERNATE ACTIVITIES

1. Display other items used by people in these occupations - tools, insulating materials, splicing clamps, climbing belt, etc.
2. Arrange a field trip to the training area or classroom of the telephone company where linemen/women and cable splicers are given simulated on-the-job training. Have a simple training session presented to the students by a telephone company instructor.

LEARNING ACTIVITY PACKAGE 23

Category: Energy and Power

Focus: Manufacturing Inspector

Activity: Class Discussion/Student Exercise

Objective: At the conclusion of this lesson, the student will demonstrate an understanding of the type of work done by a manufacturing inspector through participation in two types of quality control exercises.

EQUIPMENT, SUPPLIES, AND FORMS

1. Quantity of nails (500-1,000 depending on class size).
2. Pieces of wood (pine 2" x 3" x 3/4", two per student).
3. White vegetable glue.
4. Rubber bands.
5. Occupational Outlook Handbook.

RATIONALE.

The purpose of this activity is to expose students to jobs in the field of inspecting and quality control. It provides students with an opportunity to participate in exercises representative of the work done in quality control.

SUGGESTED PROCEDURE

Discuss with the students, using the Occupational Outlook Handbook as a guide, the basic information about the nature of the work, employment outlook, and salaries, and explain the variety of products which fall under the close scrutiny of inspector

To provide awareness of the job and a hands-on experience of two types of quality control, the students should participate in the following exercises:

The first exercise is a sampling method used to inspect the quality of a manufactured product by inspecting randomly selected samples of the product.

Obtain a quantity of nails that are to be inspected for properly formed heads and points. An acceptable standard may be one percent, or one nail with an improperly formed head or point, in each hundred nails inspected. In the quantity of nails that you have, there should be at least one percent which are defective. If necessary, dull the points or bend the heads to obtain this percentage. Divide the class into groups and allow each group to randomly select by counting or weighing approximately one hundred nails. Each group is to inspect the nails for improperly formed heads or points, keeping count of the number of bad nails found and the total number of nails checked. Determine the percentage of defective nails by dividing the number of defective nails found by the number checked and multiplying by 100 to get a percentage.

The second exercise deals with a quality-control method called destructive testing. In order to determine product quality or construction quality, the product must be destroyed. This type of testing is used to determine the quality of joints and fastenings and the durability of products.

The students will test glue joints which they have made on two pieces of pine. Each student should have two pieces of pine (2" x 3" x 3/4"). Instruct one-half of the class to apply one thin coat of white glue to one three-inch edge of a piece of wood. Put the two pieces of wood together along the three-inch length, secure with rubber bands, and allow to dry overnight. The other half of the class is to do the same, but apply a thin coat of glue to both pieces of wood instead of just one. After the glue has dried, test each student's joint by placing the glued block in a vise, making sure that the glue joint is positioned above the jaws of the vise, and hitting the block with a hammer. If the glue joint is of good quality the wood should split before breaking the glued joint. Determine the percentage of defective joints in each group.

ALTERNATE ACTIVITIES

1. Obtain rejected samples of commercial products and inspect to determine why they were rejected.
2. Have the students write to The American Society for Quality Control, 161 West Wisconsin Avenue, Milwaukee, Wisconsin 53203, for information on certification procedures of quality control technicians.
3. Lead a class discussion on the factors which demand commercial product quality control (e.g., government regulation, consumer safety, market competition, etc.).

LEARNING ACTIVITY PACKAGE 24

Category: Energy and Power

Focus: Engineering

Activity: Film/Discussion

Objective: At the conclusion of this lesson, the student will be able to list and discuss in class the function and duties of engineers as depicted in the film.

EQUIPMENT, SUPPLIES, AND FORMS

1. Film, Engineering Challenge available from Bell Telephone; contact the nearest Illinois Bell education representative.

RATIONALE

The purpose of this lesson is to introduce students to the wide and challenging field of engineering.

SUGGESTED PROCEDURE

Engineering is a profession that has many specialties and subdivisions. The basic knowledge that is required for all areas of engineering makes it possible for engineers to shift from one field of specialization to another without a great deal of retraining. The person considering engineering as a career should become familiar with the general nature of engineering as well as its various branches.

The film Engineering Challenge is somewhat dated but the functions and duties which are shown are relatively unchanged with respect to the general nature of engineering. Show this film to the students instructing them to list and be prepared to discuss, the duties and functions of engineers as explained in the film.

The discussion can be based upon the following questions: What contributions to the welfare, technological progress, and defense of the nation have been made by engineers in the past and present? What can be expected in the future? As various contributions are identified, have the students also identify which of the following branches of engineering the contributions may have come from: aerospace, agricultural, biomedical, ceramic, chemical, civil, electrical, industrial, mechanical, metallurgical, and mining.

Descriptions of each of these engineering branches may be found in the Occupational Outlook Handbook.

ALTERNATE ACTIVITIES

1. Visit an engineer at work or interview an engineer as a resource person.
2. Have students write to universities and colleges for information about engineering curriculums.
3. Have students identify industrial fields which utilize engineering personnel in the local area. Students can refer to the yellow pages of the local telephone directory and an area industrial classification register as source materials.

LEARNING ACTIVITY PACKAGE 25

Category: Energy and Power

Focus: Mining, Petroleum, and Gas Production Occupations

Activity: Film/Discussion

Objective: At the conclusion of this lesson, the student will demonstrate knowledge of jobs in mining petroleum, and gas production, and be able to determine if they may be suited for a career in this area by active participation in a class discussion.

EQUIPMENT, SUPPLIES, AND FORMS

1. Film - Is A Career In Mining, Petroleum, or Gas Production For You? Purchase or rent from: Counselor Films, 2100 Locust Street, Philadelphia, PA 19103.

RATIONALE

The purpose of this activity is to expose students to careers in the mining, petroleum and gas production industry.

SUGGESTED PROCEDURE

The mining and petroleum industry provides most of the basic raw materials and energy sources for industrial and consumer use. Metal mines provide iron, copper, gold, and other ores. Quarrying and other non-metallic mining methods yield many basic materials such as limestone and gravel. Nearly all of our energy for industrial and personal use comes from oil, gas, and coal. Few products from mines reach the consumer in their natural state, for nearly all require some type of processing.

Have the students view the film, keeping in mind the following questions:

1. What traits and aptitudes should you have for working in the mining and petroleum industry?
2. Is employment increasing in this industry?
3. Do many women work in the mining and petroleum industry?
4. How important is the mining and petroleum industry?
5. Are workers in the mining and petroleum industry well paid?
6. Would you like working in the mining and petroleum industry? Why?

Have the students answer the six questions listed above either in class discussion or on paper. If you choose the class discussion method, write the answers on the blackboard so that everyone will be aware of them.

ALTERNATE ACTIVITIES

1. Have students write to mining and petroleum companies for additional occupational information about the industry.
2. Have a resource person from a local power agency (electricity or gas) come to class to discuss the local use of mining and petroleum industry products, the geographical sources of supply of these products, and trends in the industry.

LEARNING ACTIVITY PACKAGE 26

Category: Graphic Communications

Focus: Architect

Activity: Student Exercise/Discussion

Objective: At the conclusion of this lesson, the student will be able to describe the basic skills an architect needs to design a floor plan for a home.

EQUIPMENT, SUPPLIES, AND FORMS

1. Suitable paper for drawing or sketching (9" x 12" may be used, but 18" x 24" is preferred).
2. Pencils and erasers.
3. Architect's scale or ruler.
4. Assortment of house floor plans (these may be obtained from builders, lumber companies, or publications with home building ideas and plans).
5. High school architectural drawing textbook for reference use.

RATIONALE

This lesson is designed to inform students of the occupation of architect by having the students design a floor plan for a house from specifications provided by the instructor.

SUGGESTED PROCEDURE

Ask the students to draw or sketch a floor plan for a house which contains the following: 3 bedrooms, 2 bathrooms, kitchen, dining room or area, family room, living room, laundry facilities, and two-car garage. The plan should have a good traffic pattern. The drawing is to be drawn to scale using 1/8 or 1/4 inch equal to one foot, depending upon the size of the paper used, representing a house no larger than 50 feet by 75 feet.

The students should use sample floor plans for ideas and methods. The sample floor plans should not be copied or traced, but may be modified where necessary. Templates for doors, windows and kitchen and bath fixtures may be used if available.

Using the Occupational Outlook Handbook as a guide, discuss with the students the training requirements, employment outlook, earnings, and working conditions in this field. This may be done before or after the students do their drawings. Additional information may be obtained from drafting or architectural textbooks.

Evaluate the student's drawings in terms of whether the specifications have been met, neatness, and if the plan has an acceptable traffic pattern. The evaluation should not be graded but emphasized as the type of evaluation which an architect makes on all of the drawings and designs he or she may produce.

ALTERNATE ACTIVITIES

1. Have the students individually, or as a class project, construct a model building.
2. Visit an architect's office or invite an architect to visit the school bringing drawings for the students to see.

LEARNING ACTIVITY PACKAGE 27

Category: Graphic Communications

Focus: Drafting Occupations

Activity: Student Exercise/Discussion

Objective: At the conclusion of this lesson, the student will be able to discuss some of the basic skills, equipment, and positions associated with occupations in drafting.

EQUIPMENT, SUPPLIES, AND FORMS

1. Suitable drawing paper, 9" x 12" or larger.
2. Pencils, including a selection of drafting pencils and mechanical drawing pencils.
3. Erasers.
4. Drawing scales with full-size measurement.
5. T-Square.
6. 45 degree and 30-60 degree triangles.
7. Drawing board or straight-edged table.
8. Tracing paper, 9" x 12" or larger.
9. Compass.
10. Reference: any high school drafting textbook.

RATIONALE

The purpose of this activity is to familiarize students with some of the skills, equipment, and positions in the drafting field by producing a simple, three-view drawing. Students will perform the duties of draftsmen, checkers, tracers, and supervisors.

SUGGESTED PROCEDURE

In this lesson the students are to be involved in the production of finished drawings which have been made by draftsmen, checked for accuracy by the checker and traced for reproduction by the tracer.

Have the students make finished drawings, including tracings of three objects; a three-inch cube, a rectangle (1" x 2" x 3"), and a two-inch sphere or ball. All of the objects are to be drawn in three views; front, top and right side or orthographic projection. Divide the class into three groups. Each group should have one person assigned as the supervisor, and the remaining members of the group as draftsmen, checkers, and tracers. The student supervisors should assign their group one of the three objects to be drawn, checked and traced. The student supervisor is responsible for seeing that the work is carried out by the proper members of the team and being sure that the workers have the necessary equipment to do the job. Each draftsman should produce one drawing. Each checker of the team should check and initial the drawing before passing the drawing on for tracing or returning it to the draftsman for correction. Each tracer should trace one drawing.

Using the Occupational Outlook Handbook as a guide, discuss with the students the jobs which they have been performing. Other activities which may be incorporated in the student exercise would be reproduction of the traced drawings by the diazo method, and conversion to metric measurements on the drawings.

ALTERNATE ACTIVITIES

1. Visit a drafting department in an industrial plant.
2. Invite a draftsman to the class as a resource person for an interview.
3. Have the students identify local industries in which drafting occupations are available by researching employment security office job titles.

LEARNING ACTIVITY PACKAGE 28

Category: Graphic Communications

Focus: Commercial Artist

Activity: Discussion/Student Exercise

Objective: At the conclusion of this lesson, the student will be able to perform tasks performed by commercial artists as a result of participation in the student exercise and class discussion.

EQUIPMENT, SUPPLIES, AND FORMS

1. Scissors.
2. Glue or paste.
3. Construction paper or poster board.
4. Felt tip marker or equivalent.
5. Newspapers and magazines.

RATIONALE

The purpose of this activity is to expose students to careers in the field of commercial art and related occupations. It provides students with an opportunity to experience tasks which a commercial artist would face in the production of an advertisement.

SUGGESTED PROCEDURE

Participation in the student exercise will provide the students with an opportunity to experience some of the tasks a commercial art team uses in creating advertisements for newspapers and magazines.

The student exercise consists of having each student select an advertisement, preferably illustrated, from a newspaper or magazine. The student is to totally redesign the ad using illustrations, letting and other art work cut from newspapers or magazines. The message which the original advertisement delivers is to be unchanged, although the approach will be different. The students should: 1) Select an advertisement. 2) Determine the changes to be made. 3) Sketch the new ad. 4) Select and cut out appropriate art work, and lettering for the new design. 5) Make a paste up on heavy paper of the new ad using the pencil sketch as a guide. 6) Mount on poster board the original advertisement, pencil sketch and the student-created ad paste up.

Evaluation of this exercise may be based on neatness and maintenance of the original message in the student created advertisement.

As the students are working, discuss with them such things as places of employment for commercial artists, training and where it might be obtained, employment outlook, working conditions and earnings and what might be considered as advantages and disadvantages of this career. If help is needed, use the Occupational Outlook Handbook as a guide.

ALTERNATE ACTIVITIES

1. Visit a commercial art studio or advertising agency.
2. Have students create advertisements for upcoming school activities. These may be ads for the school newspaper or posters for the display.
3. Visit a newspaper to observe people who work with an ad after it is sent to the paper for publication.

LEARNING ACTIVITY PACKAGE 29

Category: Graphic Communications

Focus: Commercial Photographer

Activity: Resource Person/Class Discussion

Objective: At the conclusion of this lesson, the student will be able to describe in writing the type of work, location of work, required education and training, salary range, advancement, and some advantages and disadvantages associated with a career in commercial photography.

EQUIPMENT, SUPPLIES, AND FORMS

1. Resource Person Information Sheet (see sample in the back of this notebook).

RATIONALE

The purpose of this activity is to expose students to a career in commercial photography. It provides students with an opportunity to meet and talk with someone dealing directly with the job and to gain information and exposure not normally available in the classroom.

SUGGESTED PROCEDURE

Arrange for a photographer to come to the school and be interviewed by the students about the duties, training, education, pay, working conditions, and manner of attaining a job as a commercial photographer. The resource person should bring samples of his/her work and the tools and equipment of the occupation. In displaying the samples, there may be an interesting story which is related to the job. Encourage the resource person to briefly cover the story. The personal aspects of an occupation can be interesting and informative to the students.

The students should be prepared with questions for the interview. These questions can be developed through class discussion preceding the visit by the resource person. See the sample interview questions in the Teacher's Guide for assistance in developing questions.

Have the students complete the Job Information Sheet after the interview. Brief notes may be kept, but the students should be primarily concerned with interviewing the resource person.

ALTERNATE ACTIVITIES

1. Have the students take and develop pictures using a pin-hole box camera.
2. Organize a class discussion of the advantages and disadvantages of being a photographer for a news publication rather than working in a portrait studio.
3. Have the students examine the cost of equipment for a commercial photographer by collecting equipment catalogues and magazines from local photographic equipment suppliers.
4. Identify the state schools which provide training for this occupation by surveying curriculum offerings.
5. Have the students research local job possibilities by identifying commercial photographers in the yellow pages of the local telephone directory.

LEARNING ACTIVITY PACKAGE 30

Category: Graphic Communications

Focus: Printing and Publishing Occupations

Activity: Field Trip/Discussion

Objective: At the conclusion of this lesson, the student will demonstrate a knowledge of the wide variety of occupations in the graphic communications industry and be able to identify and list the main responsibility for each position observed during the field trip.

EQUIPMENT, SUPPLIES, AND FORMS

1. Field Trip Observation Form (see sample in the back of this notebook).

RATIONALE

The purpose of this lesson is to expose students to careers in printing and publishing. It provides students with an opportunity to meet and talk with someone dealing directly with the job and to gain information and exposure not normally available in the classroom.

SUGGESTED PROCEDURE

A field trip should be arranged with as large and complete a printing establishment as is possible. This will allow the students to have exposure to a wide variety of jobs. A newspaper or printing firm that is responsible for the production of a final product, and has people working in-house to accomplish this, will be able to cover the whole realm of the industry rather than just the printing or some other single operation.

Inform the establishment that the objective of the field trip is to identify jobs and the associated responsibilities in the industry. The people also should be aware of the types of questions that may be asked by students.

Have the students complete observation forms following the field trip. This can be done in class or on their own time.

ALTERNATE ACTIVITIES

1. Invite a resource person to visit the school and discuss this occupational area.
2. Do student exercises in printing, block, silk screen, offset, and various methods of binding.
3. Show the filmstrip and cassette tape, Printer, or the "Listen to Learn" cassette series Printing Careers, available from Eye Gate House, 146-01 Archer Ave., Jamaica, NY 11435.

RESOURCE PERSON INFORMATION SHEET

Resource Person: _____ Date: _____

Occupational Area: _____ Your Name: _____

NOTE TO STUDENT: You are required to complete one of these forms for every resource person visiting our class. In order to receive credit, be as thorough as possible.

1. List typical jobs within the occupational area:

2. Job responsibilities:

3. Working conditions:

4. Personality traits needed for occupational area:

5. Education and/or training required:

6. Advantages and disadvantages of occupational field:

7. Advancement opportunities in this occupational field:

8. Salary range (approximate starting to estimated maximum):

9. Your personal reaction to this occupational area as described by the speaker:

10. Describe your reaction to this speaker and make recommendations for improvement:

FIELD TRIP OBSERVATION FORM

Student Name _____

I. Job title _____

II. Description of major job duties (please list).

A. _____

B. _____

C. _____

D. _____

E. _____

III. Job characteristics. Check those which apply to a worker in this occupation.

___ A. Able to see physical results of work.
___ B. Competitive — must compete for advancement.
___ C. Directs activities of others — supervisory.
___ D. Helps people.
___ E. High level of responsibility.
___ F. Motivates others — must have ability to influence others.
___ G. Repetitious work.
___ H. Requires physical stamina.
___ I. Self-expression is encouraged.
___ J. Closely supervised by superiors.
___ K. Works with technical data.
___ L. Works with people.
___ M. Works alone.
___ N. Manual skills required.

IV. Educational requirements.

A. Check level required for this occupation.

___ 1. High school education desirable.
___ 2. High school education required.
___ 3. Junior college or trade school.
___ 4. Four year college — baccalaureate.
___ 5. Advanced degree — master's.
___ 6. Advanced degree — doctorate.

B. Where can this education be obtained? Name one or two schools or industries where training is available (addresses, if available).

_____

_____

C. List the course or subject areas one would need to study for this job.

_____

_____

_____

_____

D. How many years of experience and what type of training is needed before entering this occupation?

_____

_____

_____

V. Employment opportunities.

A. List employers in your area who employ people for this job.

_____

_____

B. What starting wage or salary could one expect? _____

C. How are wages determined?

Union ___ Individual contract ___ Salary schedule ___

D. What position could a person advance to after experience is obtained?

_____

E. How much pay would you expect to receive in this advanced position? _____

F. What are some of the fringe benefits of this occupation?

_____

VI. Job requirements.

A. Is a license or union membership required? _____

B. What must a person do to qualify for this license or membership?

_____

C. Where can this license or membership be obtained?

_____

D. Is bonding necessary? _____

E. Are tools required? _____

F. Do employees buy uniforms? _____

VII. Working conditions. Check those which apply to this occupation.

___ A. Overtime required.
___ B. Outdoor work.
___ C. Indoor work.
___ D. Hazardous conditions (specify). _____
___ E. Variety of jobs.
___ F. Seasonal work.
___ G. Travel required.
___ H. Unusual working hours.
___ I. Dusty or noisy conditions.

VII. Where can additional information about this occupation be obtained?

_____

_____

_____

INTERVIEW QUESTIONS

The following is a list of questions which could be used when interviewing people about their occupation. This list is not complete and is intended to be used as a "helper" in thinking up other questions.

1. Why did you pick this job?
2. How did you get started in your occupation?
3. How did you choose your place of training?
4. What educational, training, and other qualifications are there for the job?
5. If you should wish to change jobs, would the training contribute in any way?
6. Do you think this job would have a good future for me?
7. How could I get started in this career?
8. What is the salary range of this occupation?
9. What could a beginning person expect to make?
10. What are the fringe benefits?
11. Do you get paid vacations?
12. Do you have medical insurance?
13. Is there any chance of being laid-off? If so, how many times a year?
14. What sort of planning does this business have for retirement?
15. What do you or don't you like about your job?
16. What are the advantages?
17. What are the disadvantages?
18. What are the hours and working conditions?
19. Do you ever have to work holidays? If so, which ones?
20. Do you ever work on weekends?
21. Is there a special uniform you must wear, or are you free to wear what you want? Does the company provide the uniform or does the employee?
22. What tools do you need?
23. Do you have to buy your own equipment?
24. What are the physical requirements?
25. What do you do in this occupation?
26. How much traveling is involved?
27. What kinds of people do you work with?
28. Is there any chance for advancement?

29. What are your responsibilities?
30. Do you belong to a union?
31. What's a typical day like for you in this job?
32. Is there any on-the-job training?
33. Has there ever been a time when you couldn't stand your job? If so, why and when?
34. Do you have to move if the company does?
35. What work experience did you have before you started to work in this occupation?
36. Who depends on your work? Upon whom do you depend?
37. Are there opportunities for advancement in this job? If so, what are the requirements for advancement?
38. How does your job affect your personal life?
39. What kinds of people do you meet?
40. Do you work mainly with people or things?
41. Do you work a lot with ideas?
42. Does your job offer opportunities to be creative?
43. Are people with your kinds of skills usually needed - even when business may be bad?
44. Is your work at all seasonal?
45. Could you briefly describe the personal qualities a person would need to do your job - strength, height, agility, ability to think rapidly, ability to make decisions, ability to deal with other people, etc.?
46. Would you recommend this kind of work for your children?
47. How do you spend your time after work?
48. If you could have any job in the world, what would you like to be?
49. Do you still go to school for special training?
50. When are people promoted? When are people fired?

OBSERVATION/INTERVIEW FORM

NOTE TO STUDENT: These experiences are to be completed outside of class. You will need to select several people to observe and interview about different jobs. Don't use the same people or jobs that were used for the questionnaires. Check with the teacher before doing the observation/interviews. Make an appointment with the person to be observed and interviewed. Don't just walk into a place and try to complete the assignment. In setting up the appointment, explain that you are doing this as a careers class assignment. Tell the worker that you will need to observe him/her working for 1/2 hour, then interview him/her briefly to complete the form. Ask what would be this person's best time. Do it at his/her convenience. While observing the worker you are recording what you observe in Part I - Observing. . . . Then on to the interview portion of the assignment.

YOUR NAME _____ COMPANY _____

DATE _____ NAME OF EMPLOYEE _____

OCCUPATION _____

PART I: INFORMATION GATHERED DURING OBSERVATION

1. Job responsibilities:

2. Working conditions:

3. Personality traits needed for this occupation:

4. How worker is treated by customers (if applicable):

5. How worker is treated by coworkers:

6. How worker is treated by supervisor:

7. Advantages and/or disadvantages of occupation you have observed:

8. Describe your likes/dislikes of occupation observed:

PART II: INFORMATION GATHERED DURING INTERVIEW

NOTE TO STUDENT: After observing the worker for 1/2 hour, take a few minutes to talk with him/her about the questions on Part II - Interviewing. Record the worker's responses accurately. When you have finished with the interview, get the worker's signature and date. Thank him/her, and you are finished. (You'll also need to sign this form.) Be sure to schedule the Observation/Interview so that it's at a good time in the worker's day.

1. Job responsibilities you have:

2. Working conditions of your job:

3. Personality traits you find helpful in your job;

4. How you are treated by your customers:

5. How you are treated by your coworkers:

6. How you are treated by your supervisor:

7. Advantages and/or disadvantages you can see in your job:

8. What do you like/dislike about your job?

Employee's Signature DATE: _____

_____

Company: Student Signature:

_____ _____

REFERENCES

BOOKS

Electronics in Action.

Second edition. Delpit and Johnson. Johnson, Bennett, Co.: Peoria, IL 61614

Eye on the Sky: How Aircraft Controllers Work.

Creighton Peet. Macrae Smith Company: Philadelphia, PA 19100

Modern Welding.

Goodheart-Wilcox Company: 123 W. Taft Drive, South Holland, IL 60473

Occupational Outlook Handbook.

U.S. Department of Labor, Bureau of Labor Statistics. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402

Sheet Metal Work.

McKnight and McKnight Publishing Co.: Bloomington, IL 61701

The World of Construction Laboratory Manual.

McKnight and McKnight Publishing Company: Bloomington, IL 61701

FILMS AND FILMSTRIPS

Illinois Office of Education, Media and Resource Center, 100 North First Street, Springfield, IL 62777. Is a Career in Machining for You?, Is a Career as a Technician for You?, Is a Career in Electronics Manufacturing for You?

Eye Gate House, 146-01 Archer Ave., Jamaica, NY 11435. The Brick Layer, Automobile Mechanic, Labor Unions, Sheet Metal Worker, The Plumber, T.V. and Radio Repair.

Society for Visual Education, Inc., 1343 Diversey Parkway, Chicago, IL 60614. The Heavy Equipment Operator

Illinois Bell Telephone (contact the nearest Illinois Bell education representative). Engineering Challenge.

Local offices of the United Brotherhood of Carpenters. Careers in Carpentry.

Counselor Films, 2100 Locust Street, Philadelphia, PA 19103. Is a Career in Mining, Petroleum or Gas Production for You?

RESOURCES FOR INDUSTRIAL ORIENTED
OCCUPATIONS CAREER INFORMATION

Academy of Advanced Traffic
50 Broadway
New York, NY 10004

Airline Dispatchers Association
AFL-CIO
929 West Broad Street
2nd Floor
Falls Church, VA 22046

American Apparel Manufacturers
Association, Inc.
2000 K Street, NW
Washington, DC 20006

American Ceramic Society
1155 16th Street, NW
Washington, DC 20036

American Congress on
Surveying and Mapping
P.O. Box 470
Benjamin Franklin Station
Washington, DC 20044

American Foundrymen's Society
Training and Research Institute
Golf and Wolf Roads
Des Plaines, IL 60016

American Industrial Arts
Association, Inc.
Department of the National
Education Association
1201 16th Street, NW
Washington, DC 20036

American Institute of
Chemical Engineers
345 East 47th Street
New York, NY 10017

American Institute of
Industrial Engineers, Inc.
345 East 47th Street
New York, NY 10017

American Institute of Mining,
Metallurgical and Petroleum
Engineers
345 East 47th Street
New York, NY 10017

American Management Association
Management Information Service
The American Management
Association Building
135 West 50th Street
New York, NY 10020

American Paper Institute
160 Madison Avenue
New York, NY 10016

American Petroleum Institute
School Program Distribution Center
9801 Walford Avenue
Building 20
Cleveland, OH 44102

American Road Builders Association
Arba Building
525 School Street, SW
Washington, DC 20024

American Society for
Engineering Education
2100 Pennsylvania Avenue, NW
Washington, DC 20037

American Society of Civil Engineers
345 East 47th Street
New York, NY 10017

American Society of Heating,
Refrigerating, and Air Conditioning
Engineers
United Engineering Center
345 East 47th Street
New York, NY 10017

American Society of
Mechanical Engineers
United Engineering Center
345 East 47th Street
New York, NY 10017

American Society of
Safety Engineers
850 Busse Highway
Park Ridge, IL 60068

American Textile
Manufacturers Institute
1501 Johnston Building
Charlotte, NC 28202

American Watchmakers
Institute, Inc.
P.O. Box 11011
Cincinnati, OH 45211

American Welding Society
345 East 47th Street
New York, NY 10017

Associated General Contractors
of America
1957 E Street, NW
Washington, DC 20006

Association of American Railroads
Transportation Building
Washington, DC 20006

Automobile Manufacturers
Association
320 New Center Building
Detroit, MI 48202

Bricklayers, Masons and
Plasterers International
Union
815 15th Street NW
Washington, DC 20005

Chicago Technical College
Tech Building
2000 South Michigan Avenue
Chicago, IL 60616

Engineers Council for
Professional Development, Inc.
345 East 47th Street
New York, NY 10017

Graphic Arts Technical Foundation
4815 Forbes Avenue
Pittsburg, PA 15213

Gray and Ductile Iron Founders
Society, Inc.
National City - East
Sixth Building
Cleveland, OH 44114

IBM Corporation
Office Products Division
590 Madison Avenue
New York, NY 10022

Illuminating Engineering Society
345 East 47th Street
New York, NY 10017

Independent Garage Owners of
America, Inc.
624 South Michigan Avenue
Chicago, IL 60605

Institute of Electrical and
Electronics Engineers, Inc.
345 East 47th Street
New York, NY 10017

Institute of Traffic Engineers
2039 K Street, NW
Washington, DC 20006

Instrument Society of America
530 William Penn Place
Pittsburgh, PA 15219

International Association of
Machinists and Aerospace Workers
1300 Connecticut Avenue, NW
Washington, DC 20036

International Typographical Union
of North America
P.O. Box 157
Colorado Springs, CO 80901

International Union of Operating
Engineers
1125 17th Street, NW
Washington, DC 20036

Lithographers and Photoengravers
International Union
233 West 49th Street
New York, NY 10019