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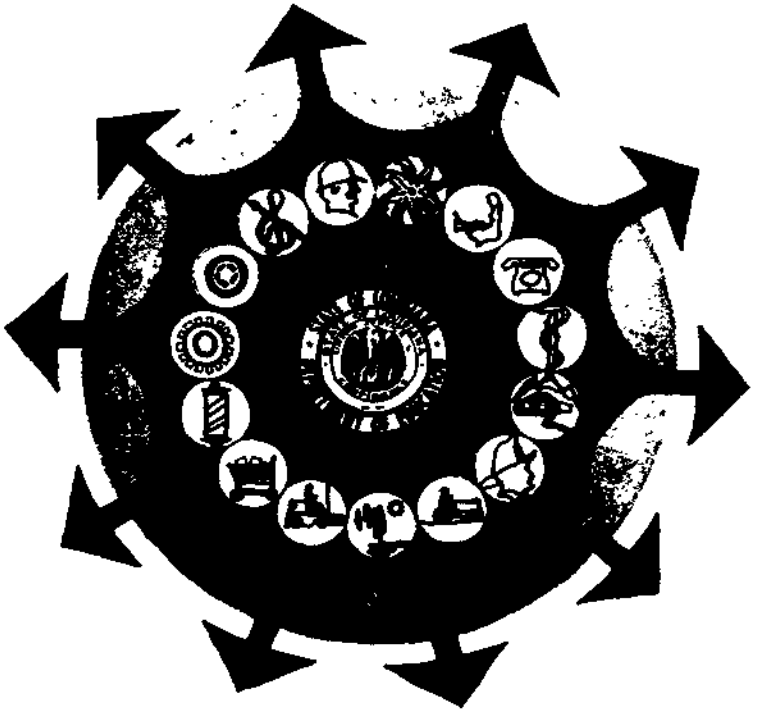
ABSTRACT

The tentative guide in communications for the middle school student is part of a series of industrial arts curriculum materials developed by the State of Louisiana. With the objective of providing career education through industrial arts, the course is designed to help youth understand the basic concepts of the communications career cluster; including, drafting, electricity, graphic arts, and photography. Through laboratory and classroom experiences, students are helped to discover their technical abilities and interests, so that they may explore and make tentative career decisions. The outline format includes performance objectives with suggested activities and resources for the major topics and subtopics. Each resource is coded to match the bibliography of educational resources that follows each major section. (NJ)



INDUSTRIAL ARTS CURRICULUM GUIDE

MIDDLE SCHOOLS 6-9

COMMUNICATIONS TENTATIVE

1974

CURRICULUM GUIDE

FOR

INDUSTRIAL ARTS

MIDDLE SCHOOLS

COMMUNICATIONS

Issued by

LOUISIANA STATE DEPARTMENT OF EDUCATION

Louis J. Michot, Superintendent

1974

P R E F A C E

The curriculum guides developed for implementation of the Louisiana State Plan for Career Education are dedicated to the students of Louisiana. The guides are based upon the philosophy of maximum development of the individual--and thereby--the maximum development of society. There are many components of the educational process; and career education, a facet of total education, prepares the individual for a meaningful and productive life.

The fundamental concept of career education is that all types of educational experiences, curricula, instruction, and counseling should involve preparation for economic independence, personal fulfillment, and an appreciation for the dignity of work.

Maintaining the curriculum disciplines as the structural framework, the guides seek to enhance the total education of the individual, incorporating career concepts into the planned educational experiences of our youth.

The implementation of the objectives and activities presented in the guides is independent of any organizational pattern. The underlying philosophy is that of providing for continuous pupil progress. The curriculum

provides a continuum of systematic, sequential development from kindergarten through high school. Recognizing that each student is a unique individual, a continuous progress curriculum enables each student to progress at his own rate. This fosters success which reinforces the positive self-concept of the individual and contributes to his personal, social, and occupational effectiveness.

Education which is dedicated to the maximum development of the individual offers individualized instruction. These guides promote that concept, for individualized learning is the result of individualized instruction. This concept does not imply a one-to-one teaching ratio, but does offer a curriculum structure which allows for instruction prescribed to meet the needs of the individual--whether in a large group, a small group, or in an individual learning situation.

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CURRICULUM GUIDE - INDUSTRIAL ARTS

MIDDLE SCHOOL OVERVIEW

Career education through industrial arts is the primary goal of this Industrial Arts Curriculum Guide. This section of the Industrial Arts Curriculum Guide provides a program for the middle school level at grades 6 through 9. In keeping the Louisiana State Plan for Career Education, this program encourages the student to explore careers related to our Industrial Society and to make tentative decisions.

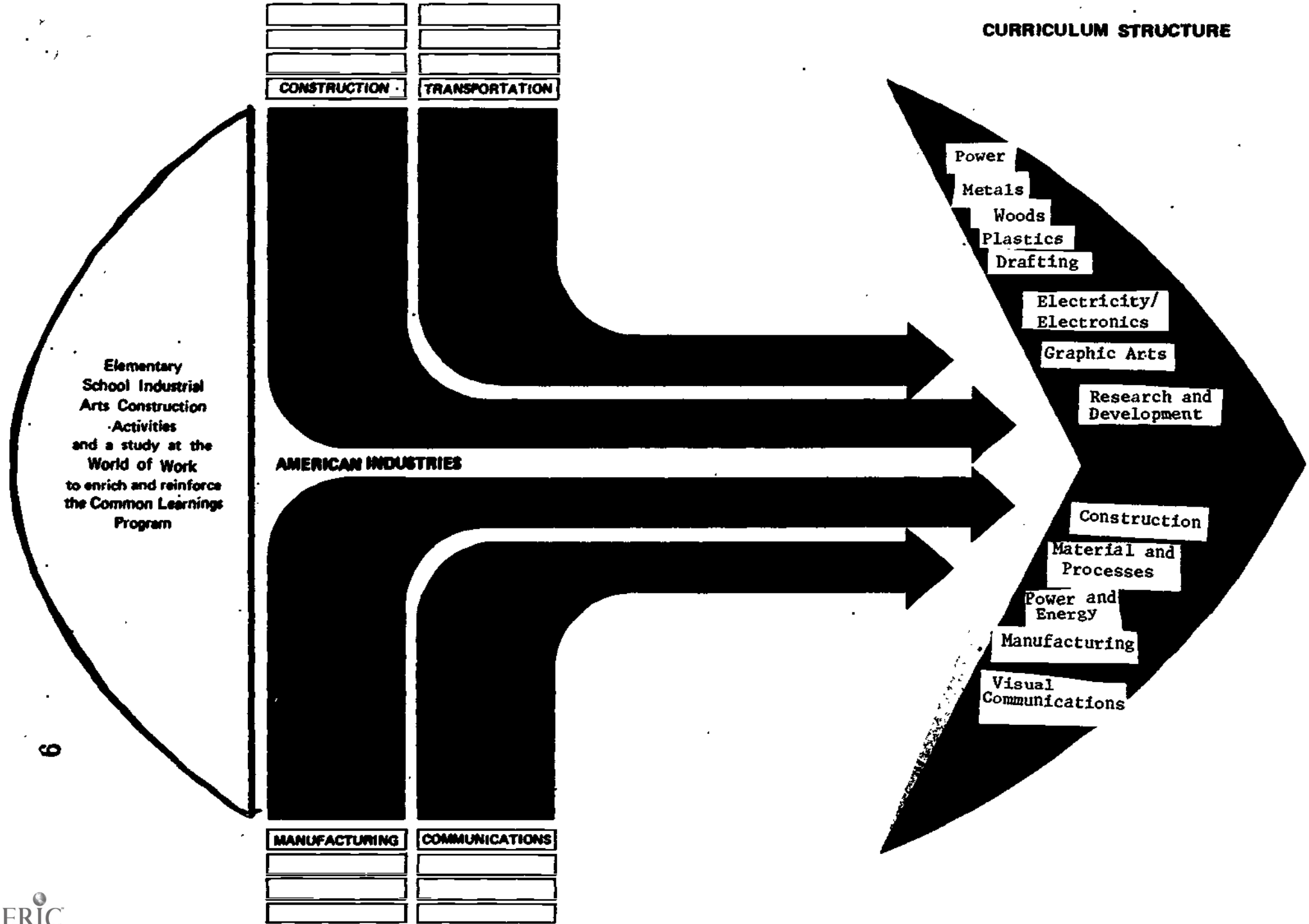
The U. S. Office of Education suggests fifteen career clusters as a working base for the study of a substantial number of the existing career opportunities. This middle school guide develops four of the clusters that have potential for primary emphasis in Industrial Arts. These four career clusters are construction, manufacturing, transportation, and communications. Components of at least five other career clusters have primary emphasis in Industrial Arts, including natural resources, business, environment, marketing, distribution, and consumer.

This Curriculum Guide should be used by the teacher to implement Career Education in Industrial Arts. The American Industries curriculum

is developed as a six- to twelve-week program to introduce the student into careers related to industry. Although the Construction, Manufacturing, Transportation, and Communications programs are designed for thirty-six (36) weeks, it should be noted there is more material provided than could normally be covered in the designed time. Student exploration and tentative decisions will be made through experiences gained through discussion, research, field trips, role-playing situations, mock industries, and "hands-on" activities. After the exploration in one or more of the industrial arts programs on the middle school level, the student can better select the job family in the secondary Industrial Arts program to further develop tentative career decisions.

Many individual educators have been involved with the writing, support, advice, and counsel during the development of this Guide. It is to these individuals that a great amount of appreciation should be expressed.

LOUISIANA INDUSTRIAL ARTS—CAREER EDUCATION

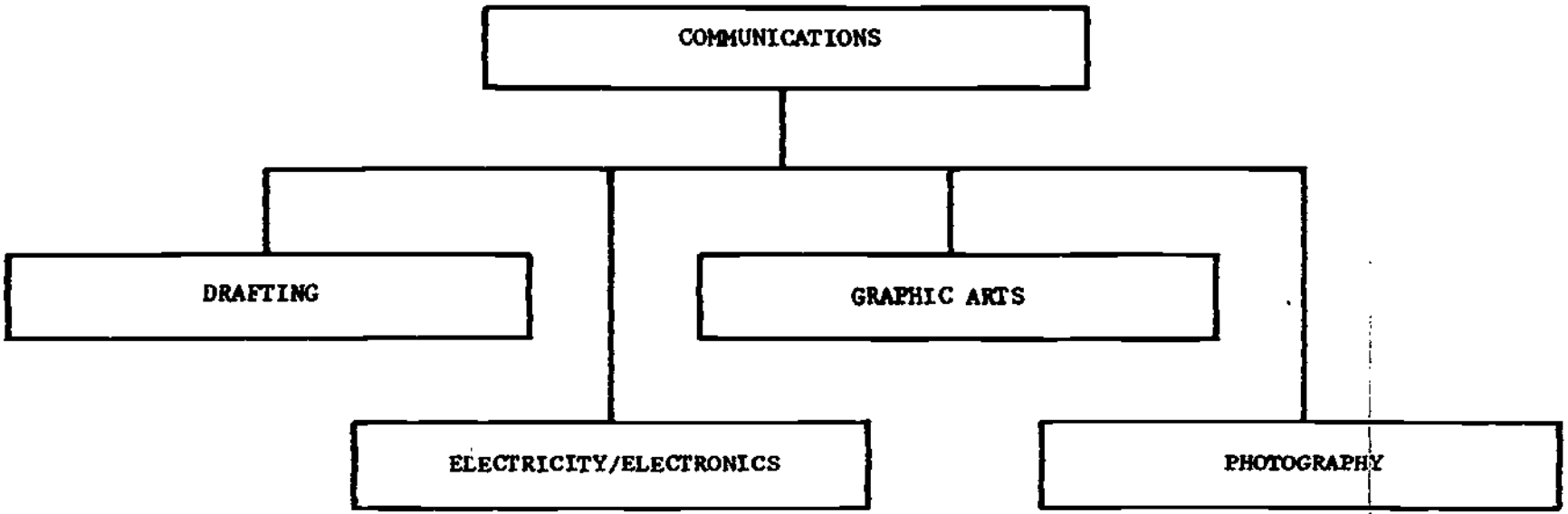


COMMUNICATION

Overview

The rapid technological advancement we evidence today has made it necessary for man to communicate not only on a person-to-person basis, but also to mass audiences by various forms to nurture creativity, we must assist him to be the receiver as well as the transmitter of communication. Industrial arts affords very effective means for the development of reading knowledge and of the ability and desire of self-expression, both freehand and by the use of instruments.

This course is designed to help youth understand the basic concepts of the communications career cluster, including: (1) drafting, (2) electricity, (3) graphic arts, and (4) photography. These areas are interrelated so they supplement and complement each other. Through laboratory and classroom experiences special attention is given to helping students discover their technical abilities and interest so they may explore and make a tentative decision toward a career.


COMMUNICATIONS
DRAFTING
GRAPHIC ARTS
ELECTRICITY/ELECTRONICS
PHOTOGRAPHY

11

COMMUNICATIONS

Drafting

Goal

Upon completion of this course the student will be able to demonstrate a basic understanding and working knowledge of the fundamentals of drafting and the ability to express ideas graphically through the use of drawing, sketches, and pattern development. The student explores the solution to real problems and develops self-expression, self-confidence, interest, and an attitude of appreciation that the exploratory knowledge gained will further his ability to make a tentative career decision.

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
I. Drafting	Students will be able to explain the following: (1) Drafting (2) Drafting as a universal language (3) The value of a picture instead of words (4) Value of dimensions on a drawing	Explanation and demonstration and student participation by giving examples of conveying an idea through a sketch.	(1) Ch. 1 (3) Ch. 1 (7) Ch. 1
II. Lead Classifications	Student will be able to classify pencils as to their degree of hardness and learn when each should be used. (1) 17 degress of hardness, softest to hardest: 6B, 5B, 4B, 3B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H, 7H, 8H, 9H.	Explanation and student participation. Students will be given a chance to draw lines with the various pencils and lead holders.	(1) P. 8 (3) Ch. 2 (8) Ch. 4
III. Types of Lines	Students will be able to identify and draw the following type lines: (1) straight (2) curved (3) parallel (4) oblique (5) diagonal (6) perpendicular (7) slanted	Explanation and demonstrations. Students will do exercises on sketching the various types of lines.	(5) Pgs. 172-173 (6) Unit 3 (7) Ch. 2 (8) P. 28
IV. Sketching Lines	Students will be able to sketch the following things: (1) Horizontal, vertical, and oblique lines (2) A corner in one plane (3) Arcs, circles, and irregular curves	Using the chalkboard the teacher will demonstrate how to sketch various lines and have students complete an exercise on sketching types of lines.	(7) Ch. 1 (8) P. 28 (11) Ch. 2

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
	(4) A sketch in which straight and curved lines are combined (5) A circle in one plane		
V. Lettering	Students will be able to letter.		(6) Unit 6
A. Upper Case	Students will be able to identify the correct position of the pencil when lettering.	Instructor will explain and demonstrate how letters should be formed using stroke method.	(1) P. 42 (3) Ch. 3 (8) P. 95
B. Lower Case	Students will be able to form letters (capitals and lower case) and/or incline fashion.	The students will be given a job sheet which will require them to do an exercise in lettering.	
VI. Drafting Instruments	Students must be able to identify and name the use of each of the following drafting instruments: (1) T-Square (2) Compass (3) Dividers (4) Triangles (5) Scale	Instructor displays one of each of the most often used drawing instruments, and demonstrates their use.	(1) Unit 1 (3) Ch. 2 (6) Unit 4 (11) Ch. 3
A. Scale	Student should be able to identify and locate divisions on a scale.	Instructor, using enlarged model, points out each division.	(1) Ch. 5 (6) Unit 4 (11) Ch. 3 (9) Ch. 5
B. Triangles	Students must be able to construct angles using the two triangles. (1) 30° - 60° - 90° (2) 45° - 45° - 90°	Demonstration by instructor using large models.	(3) Pgs. 48-49 (8) Ch. 5

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
C. T-Square	Students should be able to identify the parts of the T-Square such as: (1) Head (2) Blade (3) Drawing Edge	Instructor should have students draw angles at 15° around a point, using the T-Square and triangles.	(1) P. 7 (3) Ch. 2 (8) Ch. 4
D. Compass	Students should be able to construct circles of various sizes and to correctly sharpen point on compass.	Demonstration by instructor and supervised class activity in practice of construction using compass.	
E. Dividers	Students should be able to transfer measurement using dividers and divide a line segment into equal parts.	Instructor demonstration with large model to illustrate.	
VII. Sheet Layout	Students should be able to correctly align and draw correct margin and complete title strip.	Demonstration and supervision by instructor as to correctness of layout procedure.	(8) P. 111 (9) Ch. 3
VIII. Shape Description A. Orthographic Drawings (Working Drawings)	Students should be able to draw two and three view drawings of simple objects using projection method of developing.	Instructor should prove by demonstration that while three views may suffice, more views may be necessary.	(3) Ch. 5 (6) Units 7, 8, 9 (8) P. 87 (11) Ch. 4
B. Oblique	Students should be able to draw an oblique drawing showing table of lines.	Demonstration with actual objects by instructor.	(1) Unit 7 (3) Ch. 14 (8) Ch. 7
C. Isometric	Students should be able to draw an isometric view of assigned objects including objects with curves and holes.	Explanation and blackboard demonstration using compass to illustrate method of showing holes and circles in isometric view.	(1) P. 59 (3) Pgs. 200-202 (6) Unit 7 (8) P. 231 (11) Ch. 2

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
IX. Dimensioning	Students should be able to dimension a drawing correctly and explain reason for placing dimensions in certain areas.	Instructor should demonstrate and explain variations that are acceptable in dimensioning processes as circles and short spaces, and have students do an exercise in this area.	(1) P. 64 (3) Pgs. 130-152 (6) Unit 7 (8) P. 279 (11) Ch. 5
X. Labor-Management	The student will be able to distinguish between Labor personnel and Management personnel.	Instructor will have students list several types of workers in each category.	(13) P. 83
A. Causes of Disagreement	Student will be able to list four common causes of disagreement: (1) Rate of Wages (2) Working Conditions (3) Hours of Work (4) Benefits		
B. How Arguments are Settled	Student will be able to list three methods of settling arguments: (1) Negotiation (2) Arbitration (3) Strike	After a brief explanation by instructor, students should be able to play Role of Labor and Management in settlement of a dispute.	
C. How Labor and Management Cooperate	Student will be able to list three ways that Labor and Management cooperate: (1) Training Programs (2) Safety Programs (3) Work Promotions	Instructor will have student discuss their concept of programs that promote better relationship.	
D. Joining a Trade Union	Student will be able to define Trade and list several Trades that have union affiliation.		

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
XI. Aerospace Drafting	Student will be able to identify the following types of drawings related to aerospace drafting: (1) Assembly (2) Casting (3) Design and Assembly	Instruction will use film strips and visual aids to illustrate assembly drawing used in aerospace drafting.	(3) P. 232 (4) P. 89
XII. Architectural Drawing	Student will be able to identify and read the following types of drawings: (1) Floor Plan (2) Elevations (3) Foundations (4) Sections	Instructor will display blueprints and blue line prints so that students may identify the structural view in architectural drawing.	(3) Ch. 21 (5) P. 10 (10) P. 162 (11) Ch. 8
XIII. Electrical Drafting	Students will be able to identify and interpret the symbols used in electrical drafting.		(3) Ch. 18 (5) P. 114 (8) P. 290
XIV. Structural Drafting	Student will be able to identify and describe the structural components used in structural drafting.	Instructor will use film strip to show some of the more outstanding steel structures such as Golden Gate Bridge, and Empire State Building.	(3) Ch. 22
XV. Map Drafting	Student will be able to identify and list common symbols used in map making, such as: (1) Rest Areas (2) Camp Grounds (3) Interstate Highways (4) Trails (5) Unimproved Roads	Instructor will display several maps using symbols that students will be able to identify.	(1) P. 93

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
XVI. Graphic Charts and Diagrams	Students will be able to draw a simple line graph and explain why a graph can furnish an instant picture of statistics.	Instructor will use visual aids to show graphs and chart depicting various statistics.	(4) P. 207 (5) P. 219 (8) P. 304
XVII. Drafting as a Career	Students will be able to identify the various careers which can be found in the field of drafting, such as: (1) Draftsman (a) Junior detailer (b) Senior detailer (c) Drafting checker (d) Junior designer (e) Senior designer (f) Chief draftsman (2) Engineer (3) Industrial Designer (4) Industrial Engineer (5) Tool Designer (6) Architects (7) Building design and Construction Technical Illustrator (8) Technical Illustrator (9) Commercial Artist (10) Cartographers (11) Teaching drafting	Explanation and student participation in discussion.	(4) Unit 30-31 (5) Unit 9 (6) Unit 1 (8) P. 4 (9) Ch. 2 (11) Ch. 11

DRAFTING

Resource Materials

The following list of resource materials is by no means complete or exhaustive. They merely represent a compilation of the best and most available materials known and used by the members of the committee. (AV) is noted where audiovisuals are available.

1. Brown, Waeter C., Drafting. So. Holland, Illinois: Goodheart-Wilcox, Co., Inc., 1961.

2. Drafting A Curriculum Guide. Dallas Independent School District, Dallas, Texas.

3. French & Svensen, Mechanical Drawing. New York, New York: 7th Edition, 1968.

4. Frylund-Kepler, General Drafting. Bloomington, Illinois: McKnight and McKnight Publishing Company, Fourth Edition.

5. Giachino-Beukema, Drafting. Chicago, Illinois: American Technical Society, Second Edition, 1960.

6. Harman, Earl W., Introduction to Mechanical Drawing. Boston, Massachusetts: Allyn & Bacon, Inc., 1973.

7. Ross, Stan, The World of Drafting. Bloomington, Illinois: McKnight and McKnight Publishing Co., 1971.

8. Pawelek, Stanley J., Introduction to Drawing. Bloomington, Illinois: D. C. Heath Company, 1971.

9. Spence, William P., Drafting Technology and Practice. Peoria, Illinois: Charles A. Bennett Co., 1973.

10. Stephenson, George E., Drawing for Product Communication. Bloomington, Illinois: McKnight and McKnight Publishing Co., 1960.

11. Stephenson, George E., Drawing for Project Planning. Peoria, Illinois: Charles A. Bennett Co., 1970.

12. Wright, Lawrence S., Drafting, Technical Communication. Bloomington, Illinois: McKnight and McKnight Publishing Co., First Edition, 1960.

13. "World of Construction." Bloomington, Illinois: McKnight and McKnight Publishing Co., 1970.

NOTE: The entries in this section are numbered for the purpose of reference. The numbers listed here correspond to the numbers in parentheses located with the text of this publication in section entitled "Resources."

COMMUNICATIONS

Electricity-Electronics

Goal

After completion of this unit, the student will be able to explain fundamentals, materials, processes in appliance operation, electrical heating and lighting, magnetism, production, and transmission of power by electrical means.

Instructional units are designed so that the student will be able to plan, design, and solve meaningful problems while developing safe work habits.

The experiences gained by the students will provide an exploratory knowledge and a broad concept of the careers available in the field of Electricity-Electronics.

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
I. Electron Theory			
A. Atomic Structure	The student will be able to identify parts and characteristics of an atom.	Discussion and illustration.	
B. Law of Charges	The student will be able to state with words the "Law of Charges."	Demonstration (using magnets, pithballs, etc.).	
II. Magnetism	Student must be able to state the relation of magnetism to electricity.	Explanation and demonstration. Instructor should caution student of safety procedure to be followed in heating waxed paper over flame.	(8) Ch. 11
A. Permanent Magnets and Artificial Magnets (Shapes)	Student will be able to explain how magnets may be made artificially from soft metals and permanently from hard steel.	Instructor will demonstrate method of making a magnet from soft medals.	
B. Poles (Magnetic)	The student will be able to explain how opposite poles attract, like poles repel.		
C. Field of Force	The student should be able to identify the field of force.	Each student will construct a field of force using wax paper.	
III. Sources of Electricity	Student should be able to identify types of Electricity.	Explanation and demonstration.	
A. Static Electricity	Student must be able to state sources and causes of static electricity.	Demonstration and student participation by stroking comb in hair.	(8) Ch. 11

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
B. Current Electricity	Student must be able to give example of direct current.	Demonstration by instructor of both direct and alternating current.	(1) P. 219
1. Direct			
2. Alternating			
C. Generators	Student will be able to convert mechanical energy into electrical energy and show that current flows between two electrodes.		
D. Electricity in Cells			
1. Wet cell		Demonstration by instructor of simple wet cell recorded by galvanometer.	(1) P. 208
2. Dry cell			
IV. Conductors and Insulators	Student must be able to list examples of the substances and materials most commonly used as such.	Instructor will have students list what they consider to be insulating materials.	(1) Unit 23 (8) Ch. IV
A. Kinds of Wire	The student will be able to name the types of metal used and desirable qualities in insulation.	Exhibit different types of wire and insulating materials used to cover.	(1) Unit 7 (6) Page 12 (8) Ch. V
B. Insulating Materials			
C. Sizes			
D. Connections	Student will be able to identify essentials of good connection and contact to prevent arcing of the following types of splices: (1) Tap joint (2) Western Union	Instructor demonstrates splices and has students complete one of each type.	
1. Solderless			
2. Solder	Student will be able to make simple solder connections.	Demonstration by instructor, then students will make several various	

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
		types of joints. Discussion of soldering safety will be given.	
V. Circuits - Series and Parallel Wiring	Student will be able to distinguish the difference between opened and closed circuits. Students will be able to distinguish the differences between series and parallel circuits.	Demonstration and caution by instructor of safety precautions to be observed in wiring circuits.	(1) Unit 27 (6) P. 11 (8) Ch. VI (9) Page 20
VI. Low Voltage Switches	The student will be able to apply the principle that in general all switches are simple devices used to open or close a circuit. Student will be able to identify various conditions under which each of the following types of switches would be used: (1) Single Pole-Single Throw (2) Single Pole-Double Throw (3) Double Pole-Single Throw	Demonstration. Exhibit under supervision of instructor the operation of types of switches.	(1) Page 251
VII. Low Voltage Circuit Wiring	Student will be able to wire circuits and solve wiring problems with minimum of danger to student. Student will be able to list the necessity for various types of circuits for different jobs, such as: (1) Door Bells (2) Buzzers	Demonstration and student job assignment and participation by student in wiring circuits.	(8) Ch. 11 (6) P. 11

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
VIII. Heat (from Electricity)	Student must be able to identify size of wiring or gauge for safety factor in wiring various circuits, and explain how heat is a product of resistance when using various metals.	Instructor will demonstrate how excessive current through a small wire will cause heat and glow.	(8) Ch. VII (1) Unit 45
A. OHMS Law			
B. Heating Appliances 1. Element or coils of resistance 2. Toasters 3. Curling Irons 4. Waffle Iron	Student must be able to apply the formula to determine resistance in various circuits obstructing the flow of current and detect that heating elements are a product of resistance.	Explanation and demonstration optional.	
C. Fuses and their Function 1. Plug Type 2. Cartridge Type	Student must be able to identify and relate the purpose of fuses and their vital role as a safety device.	Repeated emphasis on safety demonstration, if possible, as to the purpose of fuses as a dominant safety factor.	(1) Page 37
D. Other Applications of Heat from Electricity			
IX. Lighting with Electricity A. Light Bulb B. Two-way Switch for Lights	Student must be able to relate why Tungsten is one of the most desirable materials for filament.	Display model with switches and light bulbs.	(6) P. 11 (2) Unit 15

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
C. Lights in Parallel and Series	Student must be able to show that lights in series do not burn independently of each other and will burn out when No. of bulbs divided into 115 volts exceeds capacity of each bulb.	Exhibit display with lights in series and parallel on low voltage circuit.	
D. Extension Cords and Sockets 1. Materials used in Extension Cords Depending on Appliance	Student must be able to identify the difference in materials that must be used for appliances with resistance and high amperage and wire and extension that must work using suitable cord-plug and socket using underwriter knot.	Compare types of cord and display types of sockets. Insist on correct choice of wire plug and socket.	(1) P. 35 (6) Pgs. 11-12
2. Types of Sockets a. plain b. push-button c. key d. pull chair	Student will be able to identify the types of sockets.		
3. Underwriter's Knot for Safety Factor	Students will be able to demonstrate correct procedure for removing plugs from wall outlets and sockets.	Instructor should point out simple cautions to be observed in removing plugs from outlets and changing wires in plugs.	(1) P. 35
X. Labor - Management	The student will be able to distinguish between Labor and Management personnel.	Instructor will have students list several types of workers in each category.	(11) Pgs. 125-131
A. Causes of Disagreement	Student will be able to list four common causes of disagreement:		

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
	(1) Rate of Wages (2) Working Conditions (3) Hours of Work (4) Benefits		
B. How Arguments are Settled	Student will be able to list three methods of settling arguments: (1) Negotiation (2) Arbitration (3) Strike	After brief explanation by instructor, students should be able to play Role of Labor and Management in settlement of a dispute.	
C. How Labor and Management Cooperate	Student will be able to list three ways that Labor and Management cooperate: (1) Training Programs (2) Safety Programs (3) Work Promotions	Instructor will have students discuss their concept of programs that promote better relationship.	
D. Joining a Trade Union	Student will be able to define Trade and list several Trades that have union affiliation.	Instructor will have labor representative give short talk to students.	
XI. House Wiring A. Size B. Splice (Connector) C. Switches D. Junction Boxes E. Conduit	Student should be able to state the reason for size of wire and types of hardware used in house wiring and list careers available in this field. Students should be able to identify the following symbols on a wiring diagram: (1) Outlet and Junction Boxes (2) Overhead Fixtures (3) Wall Fixtures	Point out basic fixtures and wire used in house wiring. Display types of fixtures used in house wiring for students to examine.	(1) Unit 43 (6) P. 67
XII. Communication by Means of Electrical Transmission	The student must be able to explain and give examples of the different devices that transmit by means of electricity.	Instructor should exhibit as many devices that transmit by means of electricity.	(1) Unit 48 (2) Sec. 7 (3) P. 37

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
A. See			
B. Feel			
C. Hear			
1. Telephone 2. Telegraph 3. Radio 4. Television 5. Tape recorder 6. Phonograph			
XIII. Electrical Power	Student should be able to relate the career oriented occupational titles in the field of electricity-electronics.	Instructor relates the need and career advantages in the field of electricity.	(1) Unit 59 P. 360
A. Occupational Titles and Careers in Electricity	Students will be able to identify the various careers which can be found in the field of electricity-electronics.	Discuss areas of career opportunity in the field of electricity-electronics.	(10) See Index on Classification
B. Occupational Titles	(1) Appliance Serviceman (2) Electrical Assembler (3) Electrical Engineer (4) Electrical Inspector (5) Instrument Mechanic (6) Electrical Technician (7) Electrician (8) Electrical Meter Reader (9) Electrologist (10) Power Lineman (11) Telephone Installer (12) Television Repairman (13) Electric Motor Repairman (14) Electroplater (15) Radio Operator		

ELECTRICITY-ELECTRONICS

Resource Materials

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1. Buban and Schmitt, Understanding Electricity and Electronics. New York, New York: McGraw-Hill Publishing Company, 2nd Edition, 1969.

2. Buban and Schmitt, Technical Electricity and Electronics. New York, New York: McGraw-Hill Publishing Company, 1972.

3. Delpit, George H., Electronics in Action, Book 2. Peoria, Illinois: Charles A. Bennett Company, Inc., 1972.

4. Electricity Electronics Curriculum Guide for Industrial Arts Education, Missouri State Department of Education, 1972.

5. Communication-Manufacturing-Power Curriculum Guide, Orange County Orlando, Florida, 1969.

6. Electricity & Electronics Curriculum Guide, Dallas School District, Dallas, Texas, 1968.

7. General Electronics Technology. Georgia Department of Education, Atlanta, Georgia, Second Edition, 1969.

8. Lush & Engle, Industrial Arts Electricity. Peoria, Illinois: Charles A. Bennett Company, Fifth Edition, 1971.

9. Safety in Industrial Arts Education for Louisiana Schools, Bulletin No. 1203, Louisiana Department of Education, 1971.

10. Vocational Education and Occupations. U. S. Department of Health, Education and Welfare and U. S. Department of Labor, 1969.

11. "The World of Construction" Industrial Arts Curriculum Project. Bloomington, Illinois: McKnight and McKnight Publishing Company, 1970.

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COMMUNICATIONS

Graphic Arts

Goal

In this phase of communication, the student learns of the variety of careers in bookbinding, silk-screen, letterpress printing, intaglio processes, block printing, rubber-stamp construction, themography, and type composition.

Provision is made for students to develop accuracy, judgment, and craftsmanship and to have the advantages of participation in experimental and other career exploratory activities. Special attention is given to helping students discover their technical abilities and interest and to obtaining career information.

Students have an opportunity to design, plan, and complete appropriate articles and learn of the careers related to those articles. Both individual and group projects are encouraged. Students will use practical applications of language arts, mathematics, and science in solving meaningful problems. They will also use safe work habits and will participate actively in the operation and management of the communications laboratory.

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
I. Introduction A. Printing and Publishing Industry	The students will be able to discuss the following subjects dealing with printing and publishing: (1) Kinds of publishing (a) Newspaper (b) Book (c) Periodicals (2) Publisher's acceptance (a) Printing (b) Copyrighting (c) Advertising (d) Selling	Discussion-illustrations by instructor and classroom discussion. Field trip to newspaper or book company, if possible.	Local newspaper company
B. Occupational Opportunities	The student will be able to identify the following careers: (1) Publishers (2) Editors (3) Readers (4) Writers	Discussion-illustrations by instructor. Guest speakers in one of these occupational fields may be asked to speak to the class.	Local newspaper company
II. Paper A. Making pulp paper	The students will be able to identify the manufacturing processes of pulp paper.	Discussion, slides, illustrations.	(2) Ch. 5 (13) Ch. 3
	Students will be able to make paper from paper.	The students will make paper using an ordinary tub, a mold consisting of a frame covered with a fine mesh copper screen and a deckle, which is a simple frame that fits over the mold, after the instructor demonstrates the process.	
B. Selecting Correct Kind of Paper for a Job	The students will be able to identify the different types of paper: (1) News print (2) Book paper	Discussion--illustrations. Different type of paper should be on hand for illustrations.	Community printing companies

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
	(3) Writing paper (4) Deckled edges (5) Cover papers (6) Cardboards This will also include the sizes, weights, and quantities.		
C. Testing Grain of Paper	The student will be able to select a method of testing grain of paper.	Discussion--demonstration.	
D. Sizing and Coloring Paper	The student will be able to describe the sizing and coloring of paper.		(3) Ch. 11 (13) Ch. 18
E. Cutting Paper	The student will be able to cut paper.	Teacher will demonstrate, discuss, review, and test students, individually and grouped, on the safety when using a paper cutter. Students will be given an opportunity to cut paper with the paper cutter.	(3) Ch. 5 (14) P. 25
F. Marbling Paper	The student will be able to name the process used in marbling paper.	Demonstration by instructor and then students will perform the process.	
III. Ink			
A. Types of Ink and Usage	The student will be able to name the different types and usages of inks such as: (1) Job black (2) Bond inks (3) Halftone inks (4) Cover inks (5) Inks for cylinder presswork (6) News inks (7) Lithographic (offset) inks	Discussion--demonstration. Different type inks should be available for illustration.	(13) Ch. 17 Local community printing companies

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
B. Care of Printing Inks	The student will be able to care for inks in respect to ink driers, mixture of colored inks, and storage.	Discussion--demonstration.	
IV. Type Composition			
A. Selecting Type for a Job	The student will be able to identify the different kinds of type, such as: (1) Foundry type (2) Type cast on slugs or bars of type metal (3) Monotype (4) Brass type The student will be able to describe the parts of type, type metal, and the point system.	Discussion--demonstration. Students will be given a chance to see and touch some type. (Different kinds should be available for demonstration. Also, it is suggested that nothing smaller than 12 point type be used.)	(13) Ch. 5
B. California Job Case	The student shall be able to use the California job case in respect to its divisions, printer's spacing material, demon characters, ligatures, and the safety aspects of handling the type cabinets.	Discussion--demonstration. Information sheet may be given to students.	(13) Ch. 4
C. Cutting and Piecing of Leads and Slugs	The student must be able to explain the different thicknesses of leads and slugs and the proper way of cutting them. Students will be able to recognize type "set soiled."	Safety factors will be included with discussion and demonstration.	(3) Ch. 2 (14) P. 24

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
D. The Use of Metal, Iron, and Wood Furniture	The student will be able to use metal, wood, and iron furniture.	Teacher will make some illustration to be presented with discussion.	(13) Ch. 14
E. Composing Stick	The student will be able to use the composing stick properly.	Discussion--demonstration and then students will be given the opportunity to use the composing stick and set types. Instructor will design a project for each student to complete.	(3) Ch. 2 (13) Ch. 6
F. Distributing Type	The student must be able to identify tasks involved in distributing type.	Discussion--demonstration.	
G. Justification of Lines	The student will be able to space out lines of type so that each line will be firm in the stick, and all lines will be set exactly the same width.	Discussion--demonstration.	(13) Ch. 6
H. Justifying Straight Composition	The student will be able to identify the task involved in justifying straight composition.	Students will be given the opportunity to justify a paragraph so it makes a full line by increasing or decreasing space between words and letters of a line.	
I. Using Foundry Borders	The student will be able to set a border around type set and tie it with a string.	Students will go through the actual experience of setting a border around type set.	(3) Ch. 2 (13) Ch. 20
J. Proofing	The student will be able to apply the principals of proofreading a type set.	Discussion--demonstration.	(3) Ch. 2 (13) Ch. 8
K. Reading and Correcting Proofs	The student will be able to identify the standard proof marks and to recall how to correct a type form.	Teacher will make a large chart showing the proof marks for explanation.	

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
V. Imposition and Press			
A. Locking up forms	The student will be able to use the common methods employed to lock forms in a platen press.	Discussion--demonstration.	(3) Ch. 2
B. Preparation of Press	The daily maintenance of the press will be recognized by each student.		
	The student will be able to replace the packing and drawsheet.	Students are given an opportunity to dress the platen press.	
C. Preparing for Printing	The student will be able to perform the following tasks in sequence: (1) Inking the press (2) Lift chase into press (3) Allow clamp to snap down on chase (4) Check gripper location (5) Make first trial impression (6) Scribe line for side and bottom guides (7) Space guides for easy feeding (8) Attach guage pins to drawsheet (9) Clean impression from drawsheet (10) Position paper at guides (11) Check location of printing (12) Move grippers to margins (13) Tape pins down		
D. Feeding the Press	The student will be able to demonstrate the proper way to feed the press.		

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
	The student will be able to recall and demonstrate the safe practices in operating a press.	Teacher will demonstrate, discuss, review, and test students, individually and grouped, on the safe way to operate the platen press.	(14) P. 26
VI. Intaglio Printing			
A. Prepare Simple Design	The student will draw the specific design for the job.	Students may choose design he wants from an assortment which should be available.	(3) Ch. 9
B. Cutting and Image	The student will be able to transfer a design on metal which has been covered with acid resist.	Discussion--demonstration and safety aspects of handling acid resist will be brought out.	
C. Making an Etching	The student will be able to etch metal.	Safety: (1) The following protective clothing should be worn: rubber apron, gloves, and safety goggles. (2) Care should be taken not to breathe the fumes. (3) Proper ventilation is necessary when mixing and etching is done. (4) Etching mordants may be used to supplement acids. (5) Solutions for etching should be used only in rubber, glass, or ceramic trays.	
D. Printing the Image on the Appropriate Stock	The student will be able to print an image on the proper stock.	The instructor will prepare job sheets which would go through the whole process of intaglio printing.	

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
VII. Block Printing			
A. The Design	The student will be able to identify the importance of the principles of balance, emphasis, continuity, and contrast in the preparation of a design. The student will be able to perform the two basic methods of reproducing a given design: (1) The design is cut in relief on the block. (2) The design is incised in the block which leaves the background in relief.	Discussion--demonstrations and illustrations.	(3) Ch. 10
B. Transferring the Design on the Block	The student will be able to explain how to transfer a design on a block.		
C. Carving the Block	The student will be able to use the following tools: (1) 1/8 guage (2) 1/4 gauge (3) 3/16 gauge (4) 1/64 veining (5) a small knife	The safety in the use of these hand tools will be illustrated by the instructor. Students will be given an opportunity to perform all the different steps when making a block print.	
VIII. Services in Printing	The student will be able to discuss the following things which deal with services in printing: (1) Local newspapers (2) News services (3) Consumer information (4) Knowledge of service limitations (5) Advertisement	Discussion and illustration by the instructor.	

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
IX. Labor-Management	The student will be able to distinguish between Labor personnel and Management personnel.	Instructor will have students list several types of workers in each category.	(16) P. 83
A. Causes of Disagreement	Student will be able to list four common causes of disagreement: (1) Rate of Wages (2) Working Conditions (3) Hours of Work (4) Benefits		
B. How Arguments are Settled	Student will be able to list three methods of settling arguments: (1) Negotiation (2) Arbitration (3) Strike	After a brief explanation by the instructor, students should be able to play Role of Labor and Management in settlement of a dispute.	
C. How Labor and Management Cooperate	The student will be able to list three ways that Labor and Management cooperate: (1) Training Programs (2) Safety Programs (3) Work Promotions	Instructor will have students discuss their concept of programs that promote better relationship.	
D. Joining a Trade Union	Student will be able to define trade and list several trades that have union affiliation.	Instructor will have labor representative give short talk to students.	
X. Bookbinding			
A. Cutting and Trimming Paper	The student will be able to do some cutting and trimming paper.	Teacher demonstrate, discuss, review, and test students, individually and grouped, on the safe operation of the paper cutter. Also, careers involved in bookbinding may be discussed.	(2) Ch. 25 (3) Ch. 7 (14) P. 25

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
B. Gathering and Jogging Stock	The student will be able to gather paper together and put it under pressure.		
C. Folding Paper	The student will be able to explain the proper way of folding paper.		
D. Preparing and Making Pads	When making pads, the student will be able to perform the following tasks: (1) Put pads under weights (2) Apply padding compound (3) Cut pads (4) Trim pads on three sides (5) Completing pads	Students will prepare and make pads in the laboratory.	
E. Stitching Booklets with Wire by Side Stitch and Saddle Stitch	Given a stitching machine, the student will be able to illustrate the different tasks of side and saddle stitching.	Discussion--demonstration. Students will be given a chance to operate the stitching machine. Teacher will discuss, demonstrate, review, and test students, individually and grouped on the safety when using a stitching machine.	(14) P. 27
F. Making a Hard Cover for a Notebook	The student will be able to explain the task involved when making a notebook cover.	Discussion--demonstration and student participation.	
G. Repairing a Book	The student will be able to explain the concept in book repair.	Student may be allowed to repair old school textbooks.	
XI. Silk Screen Printing			

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
A. Preparing a Design	The student will be able to cut out his chosen design to the correct dimensions.	Discussion--demonstration.	(2) Ch. 7 (3) Ch. 6
B. Selecting Suitable Inks	The student will be able to identify the various type inks used for specific jobs in silk screening.	Teachers will have various types inks in the laboratory to introduce them to the students.	Survey of community printing companies.
C. Printing the Silk Screen Job	When learning how to print a silk screen job, the student will be able to perform the following: (1) Fit mask to frame (2) Cut opening in mask (3) Seal mask to silk (4) Place ink in screen frame (5) Handling squeegee at an angle (6) Removing finish copy from the screen	The instructor will prepare job sheets which would instruct the student to go through the whole process of silk screen printing.	
XII. Other Duplicating Processes			
A. Offset Duplicator	The student will be able to make a master plate and operate the offset duplicator.	Discussion--demonstration, and student participation in the operation of the offset duplicator. The instructor may discuss planographic printing and its close relation to the offset duplicator. Also, careers in offset printing may be discussed at this time.	(2) Ch. 9 (3) Ch. 14

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
B. Mimeograph Machine	The student will be able to demonstrate stencil making and the operation of the mimeograph machine.	Discussion--demonstration and student participation in the operation of the machine.	
C. Ditto Machine	The student will be able to make a master copy and operate the ditto machine.		
H. Hot Stamping	The student will be able to use the hand pallet.	Students will be given the opportunity to heat the hand pallet on a hot plate and do a stamping and be cautioned not to touch heated hand pallet.	(3) Ch. 5
E. Making a Rubber Stamp	The student will be able to perform the following operations in rubber stamp making: (1) Lock type form in case (2) Slide form into press for preheating (3) Place plastic over type (4) Adjust the plastic in press (5) Pry matrix from type form (6) Dust matrix and stamp gum with soapstone (7) Vulcanizing the stamp gum (8) Strip vulcanized stamp gum (9) Test the stamp for proper vulcanization (10) Trim excess rubber from stamp (11) Prepare molding for stamp	Each student will make a rubber stamp in the laboratory.	(2) Ch. 6

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
XIII. Printing as a Career	The student will be able to identify the various careers which can be found in the field of printing: (1) Linotype operator (2) Intertype (3) Monotype (4) Pressman (5) Offset Press Operator (6) Proof Pressman (7) Screen Maker (8) Silk Screen Cutter (9) Silk Screen Machine Operator, etc. (10) Bindry jobs, etc. (11) Stitching jobs, etc.	Teacher should research careers in the field of printing that may be identified to the students. One of the best texts for doing this is the "Dictionary of Occupational Titles." Note: Teachers should integrate these careers with the daily lessons whenever possible. It is also suggested that field trips be taken when feasible.	(2) Ch. 15 (5) Unit 119 (15) P. 140

GRAPHIC ARTS

Resource Materials

The following list of resource materials is by no means complete nor exhaustive. They merely represent a compilation of the best and most available materials known and used by the members of the committee.

1. Biegleisen, J. I., and E. J. Busenbark, The Silk Screen Printing Process. New York: McGraw-Hill Book Company, Inc., 1951.

2. Broekhuizen, Richard J., Graphic Communications. Bloomington, Illinois: McKnight and McKnight Publishing Company, 1973.

3. Carlsen, Davey E., Graphic Arts. Peoria, Illinois: Chas. A. Bennett Company, 1970.

4. Cleeton, Glen U., Charles W. Pitkin and Raymond L. Corwell, General Printing. Bloomington, Illinois: McKnight and McKnight Publishing Company, 1963.

5. Cornwell, Raymond L., General Printing. Bloomington, Illinois: McKnight and McKnight Publishing Company, 1957.

6. Eisenbery, James, and Francis J. Kafka, Silk Screen Printing. Bloomington, Illinois: McKnight and McKnight Publishing Company, 1957.

7. Industrial Arts Course Outline, Second Edition. California State Department of Education, 1971.

8. Jackson, Hartley E., Printing: A Practical Introduction to the Graphic Arts. New York: McGraw-Hill Book Company, Inc., 1957.

9. Kagy, Fredrick D., Graphic Arts. Chicago, Illinois: The Goodheart-Wilcox Co., Inc., 1961.

10. Larson, Louis M., Industrial Printing Inks. New York: Reinhold Publishing Corp., 1962.

11. Marinacco, Anthony, Exploring the Graphic Arts. Princeton: D. Van Nostrand Company, Inc., 1959.

12. Perry, Kenneth F., and Clarence T. Baab, Binding of Books. Bloomington: Illinois: McKnight and McKnight Publishing Company, 1967.

13. Polk, Ralph W. and Edwin Polk, The Practice of Printing. Peoria, Illinois: Chas. A. Bennett Company, 1971.

14. Safety in Industrial Arts Education for Louisiana Schools. Bulletin No. 1203. Louisiana State Department of Public Education, 1971.

15. Vocational Education and Occupation. Washington, D. C.: Department of Health, Education, and Welfare Office of Education.

16. World of Construction, Teacher's Guide. Donald G. Lux, Willis E. Ray, and H. Dean Hauenstein. Bloomington, Illinois: McKnight and McKnight Publishing Company, 1971.

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COMMUNICATIONS

Photography

Goal

In this phase of communication, the student learns of the variety of careers involved in photography.

This program provides the student with an opportunity to develop proficiency in the techniques of the various fields of photography. Students learn an appreciation for good photography and develop abilities relating to selecting and purchasing photographical materials. The work includes many practical applications of science and art skills.

Students have an opportunity to design, plan, and complete appropriate articles and learn of the careers related to those articles. Both individual and group projects are encouraged. Students will use safe work habits and will participate actively in the operation and management of the communication laboratory.

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
I. Importance of Photography	The student will be able to identify the importance of photography in respect to: (1) History (2) Social communication (3) Consumer education (4) Recreation	Discussion--illustration.	(7) Ch. 21 (7) Ch. 1 (1) Ch. 6 (3) Ch. 2
II. Simple Principles of Photography	The student will be able to describe the simple principles of photography: (1) Exposing the film (2) Developing the film (3) Printing or enlarging the picture	Discussion, illustration, and demonstration. Also, the teacher should have the following available for class discussion: (1) Camera (2) Films (3) Negatives (4) Chemicals	(1) Ch. 6 (7) Ch. 1 (2) Ch. 12
III. Kinds of Photography			
A. Still	The student will be able to identify still pictures taken by professionals, amateurs, and photolithography, which is one offset process of printing.	Discussion--demonstration. Cameras should be available for illustrations.	(7) Ch. 16 (1) Ch. 6 (3) Ch. 1
B. Movie	The student will be able to describe orally professional movie photography which includes news, recreational, and describe amateur photography.		
C. Microscopic	The student will be able to recognize microscopic photography.	Short discussion and some illustration (pictures).	(7) Ch. 21

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
IV. Laws Affecting Photography	The student will be able to explain the laws affecting the following: (1) Model releases (2) Obscene photography (3) Counterfeiting (4) Seditious literature	Discussion and illustrations by the instructor. Class discussion should be encouraged.	Local newspaper company.
V. Careers	The student will be able to identify the following career opportunities in photography: (1) Camera industries (2) Chemical industires (3) Supply houses (4) Camera stores (5) Studios (6) Printing industry (7) Government (8) Private	Teacher and class discussion. Teacher should research careers in the field of photography that may be identified to the students. One of the best texts for doing this is the "Dictionary of Occupational Titles." Note: Teachers should integrate these careers with the daily lessons whenever possible.	(9) P. 140 Local printing and newspaper companies
VI. Labor-Management	The student will be able to distinguish between Labor and Management personnel.	Instructor will have students list several types of workers in each category.	(10) P. 83
A. Causes of Disagreement	The student will be able to list four common causes of disagreement: (1) Rate of wages (2) Working conditions (3) Hours of work (4) Benefits		
B. How Arguments Are Settled	The student will be able to list three methods of settling arguments: (1) Negotiation (2) Arbitration (3) Strike	After a brief explanation by the instructor, students should be able to play Role of Labor and Management in settlement of a dispute.	

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
C. How Labor and Management Cooperate	Student will be able to list three ways that Labor and Management cooperate: (1) Training Programs (2) Safety Programs (3) Work Promotions	Instructor will have students discuss their concept of programs that promote better relationships.	
D. Joining a Trade Union	The student will be able to define trade and list several trades that have union affiliation.	Instructor will have labor representative give a short talk to students.	
VII. Cameras			
A. Types	The student will be able to identify the following type cameras: (1) Pinhole (2) Instant load (3) Polaroid (4) Reflex (5) 35mm (6) Press cameras (7) View and Studio cameras (8) Box	Discussion--demonstration and illustrations. Instructor should obtain some pictures of the various type cameras.	(8) Ch. 2 (3) P. 125 (2) P. 109 and 143
B. Parts of the Camera	The student will be able to recognize the basic parts of a camera: (1) Lenses (2) Shutter (3) Film holder (4) Flash lamp (5) View finders (6) Body (7) Aperature and shutter settings	Discussion--demonstration and illustrations with the camera.	(3) Ch. 8 (7) Ch. 1

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
		Students should be given a chance to hold the camera and look through the view finder and focus a particular view.	
C. Caring for the Camera	The student will be able to care for a camera properly.	Discussion--demonstration. Instructor should disassemble the camera and illustrate to the students the proper care for the parts.	(7) Ch. 3 (3) P. 125
VIII. Senitized Materials			
A. Film	The student will be able to describe the composition of a film in respect to its celluloid, gelatin, and light sensitive materials.	Discussion--demonstration. The instructor will use a film to illustrate its composition.	(7) Ch. 6 (2) P. 169 (3) P. 34
B. Color Film	The student will be able to describe briefly the physical make-up of a color film.	Discussion--demonstration. The instructor shall make a chart showing the physical make-up of color film.	(7) Ch. 20 (3) Ch. 10 (2) P. 169
IX. Pinhole Camera			
A. Making a Pinhole Camera	The student will be able to make a pinhole camera.	The students will build a pinhole camera in the laboratory.	(7) Ch. 6 (2) Ch. 12 (1) P. 202
B. Taking Pictures with a Pinhole Camera	The student will be able to take a picture with the pinhole camera.	Pictures will be taken by the students with pinhole cameras.	(2) Ch. 12 (7) Ch. 6 (8) Ch. 3

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
X. Using the Camera			
A. Camera Manipulation	The student will be able to do the following tasks with various types of cameras: (1) Load the film in the camera (2) Show exposure control (3) Explain the effect of camera movement (4) Adjust camera focus	Discussion--demonstration. The student will be given an opportunity to perform all the tasks of camera manipulation.	(7) Ch. 3 & 4 (2) Ch. 12 (3) P. 123
B. Taking a Still Shot	The student will be able to take a still shot with a camera.	Discussion--demonstration and student participation.	
C. Taking a Time Exposure	The student will be able to describe the procedure used to take a time exposure.		
D. Taking an Action Shot	The student will be able to explain the process of taking an action shot.		
XI. Processing the Film in the Darkroom	When developing film, the student will be able to perform the following tasks: (1) Load tank in darkroom (2) Prepare chemicals for developing and fixing (3) Check temperature of solution and adjust development time (4) Add developer and agitate chemicals during development (5) Replace developer with stop bath (6) Place film in fixer (7) Wash and dry film	Discussion--demonstration. Safety: (1) Prolonged contact with chemicals should be avoided (2) Rubber apron and gloves should be worn (3) A universal developer should be used (4) Use all solutions at correct temperature if possible; if not, adjust processing time to compensate (5) Wear goggles (6) Ask permission from the teacher before beginning task	(7) P. 108 (1) Ch. 6 (2) Ch. 12 Local photography company

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
		Students will be given an opportunity to develop the film of the pictures they have taken.	
XII. Printing Pictures from Negatives	When making prints, the student will be able to perform the following tasks: (1) Prepare mask (2) Cut opening in mask (3) Locate negative under mask (4) Adjust guides for paper on printer (5) Positioning printing paper on printer (6) Close printing frame (7) Place exposed paper in developer (8) Place print in stop bath (9) Place print in fixer (10) Wash prints (11) Dry prints	Discussion--demonstrations. Safety: (1) Same as XI Students will be given an opportunity to make a print of the films they have developed.	(2) Ch. 12 (1) Ch. 6 (7) P. 108
XIII. Making Enlargements	When making enlargements, the student will be able to perform the following tasks: (1) Arranging negative in carrier (2) Focus the enlarger (3) Prepare test strips (4) Make test strips (5) Develop test strips (6) Select best exposure time on test strip (7) Make enlargement using same time exposure as on best test strip (8) Develop, fix, wash and dry picture	Discussion--demonstrations. Safety: (1) Same as XI	(1) P. 202 (7) P. 130 (3) P. 111

TOPIC OUTLINE	PERFORMANCE OBJECTIVES	SUGGESTED ACTIVITIES	RESOURCES
		Students will be given an opportunity to make an enlargement. To corrilate the two subjects of graphic arts and photography in Communication, the instructor might have each student or groups of students make a scrap book. When making this book, the students could gain practical application of all the experiences they had in printing and photography. Also, during this time the instructor may integrate the different type careers which may be found in these fields.	

Resource Materials

The following list of resource materials is by no means complete nor exhaustive. They merely represent a compilation of the best and most available materials known and used by the members of the committee.

1. Benson, Lavon Smith and Marion E. Maddox, Elements of American Industry. Bloomington, Illinois: McKnight and McKnight Publishing Company.

2. Carlsen, Darvey, Graphic Arts. Peoria, Illinois: Chas. A. Bennett Co., Inc., 1970.

3. Cogoli, John E., Photo Offset Fundamentals. Bloomington, Illinois: McKnight Publishing Company, 1973.

4. General Graphic Arts Technology, Georgia Department of Education: Atlanta, Georgia, 1969.

5. Johnson, William H. and Louis V. Newkirk, The Graphic Arts. New York: The Maconillan Co., 1953.

6. Marinacco, Anthony, Exploring the Graphic Arts. Princeton: D. Van Nostrand Company, Inc., 1959.

7. McCoy, Robert A, Practical Photography. Bloomington, Illinois: McKnight and McKnight Publishing Company, 1972.

8. Sayre, I. H., Photography and Platemaking for Photo Lithography. Chicago: Lithographic Textbook Publishing Co., 1959.

9. Vocatioanl Education and Occupations. Washington, D. C.: U. S. Department of Health, Education and Welfare Office of Education, 1969.

10. The World of Construction. Teacher's Guide. Donald G. Lux, Willis E. Ray, and H. Dean Hauenstein. Bloomington, Illinois: McKnight and McKnight Publishing Company, 1971.

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