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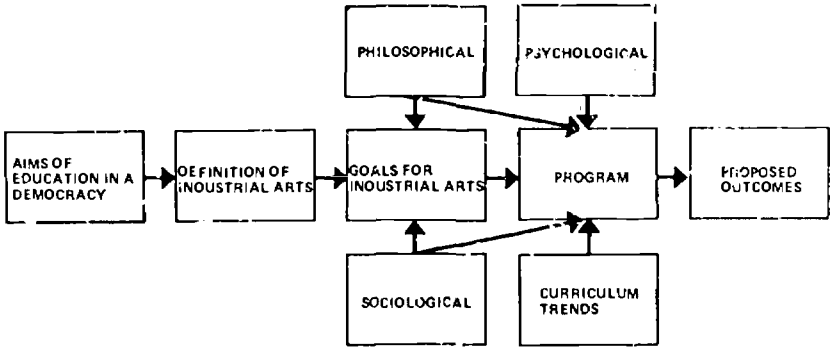
ABSTRACT

This brief publication conveys the thinking, concerns and rationale behind the Maryland Plan for a junior high school industrial arts program. A development model begins with the aims of education in a democracy and extends through proposed outcomes. Specific roles for the teacher are to assist students in the development of skills and techniques, to promote increased resourcefulness on the part of students, and to guide students who need assistance in the solution of problems. Points that are presented, including a limited amount of discussion are: (1) Developmental tasks. (2) Points for emphasis, (3) Student opportunities, (4) Teacher roles and characteristics, and (5) Content sources. The unit for Grade 7 is the anthropological study of technology, for Grade 8 it is the contemporary study of industry, and for Grade 9 the contemporary study of industry and technology. (GEB)

The Junior High School Program in Industrial Arts

THE MARYLAND PLAN

A Study of Technology and Industry with their Implications for Man and Society.



The Maryland Plan Development Model

The Maryland Plan for a junior high school program in Industrial Arts was partly derived from a systematic analysis of logical curriculum components. These components are represented in the above model. This analysis brought into focus the vital aspects of goals, content, and methodology which contemporary Industrial Arts should consider. The Maryland Plan grew out of a serious study of these considerations as well as out of grass roots experimentation in public school applications. The program has been in operation in secondary schools since 1954.

This publication is a portrayal of the thinking, concerns, and rationale behind the plan.

The basic element of desirable in-class experiences is a teacher who accentuctes intellectual curiosity and creativeness and who is concerned with building the kind of work group where each pupil feels worthy and wanted.

Kimball Wiles

The Teacher's Role Is:

- to assist students in the development of skills and techniques;
- to stimulate students to establish higher personal goals;
- to promote a greater exercise of judgement and decision making on the part of students;
- to promote increased resourcefulness on the part of students;
- to provide the materials and apparatus necessary for the students to achieve their goals;
- to instruct students in the use of the resources, apparatus and materials which will assist them in achieving their goals;
- to emphasize the students' worthy accomplishments;
- to guide students who need assistance in the solution of problems;
- to encourage student creativity;
- to assist students to recognize ways of refining their techniques of researching, constructing, communicating, analyzing, problem-solving, etc.; and
- to help students to evaluate their own efforts and achievements.

THE JUNIOR HIGH SCHOOL PROGRAM IN INDUSTRIAL ARTS

The junior high school program in Industrial Arts has emerged from valued Industrial Arts foundations and a point of view which has been influenced by a variety of factors. Some of these influencing factors are the most frequently discussed and recommended education practices of recent years. They have their bases in such education - supporting sciences as sociology, psychology and learning theory. Other influencing factors have been curriculum trends and educational goals appropriate for general education in a technically and socially changing democracy

It is a program which has been designed to take advantage of or make use of the following:

- the integration of mathematics, science, communications, and the social sciences into the Industrial Arts activities;
- the maximum use of the community resources extending from the total school to the state, national and even international sources;
- the use of a wider range of reading materials at all levels of difficulty and sophistication;
- the extensive use of inquiry, problem solving and experimentation in the arriving at solutions and procedures to follow;
- the effective and meaningful use of "role playing" as a technique for greater student living-learning involvement and greater direction by the student;
- the extensive use of a broad range of student activities and experiences that will permit a diversity of involvement, a greater display of talents, and a greater use of the individual's special abilities; and
- the development of experiences in keeping with the behavioral characteristics and developmental tasks of youth.

The obligation of the school in a free, open-ended society is to provide the opportunity for the fullest possible development of children, according to their needs and talents.

T. M. Stinnett

MARYLAND PLAN

Point of View: Schools Should Contribute to the Development of Each Individual According to His Needs, Interests, Capabilities and Objectives.

A number of guidelines were used in developing the Maryland Plan. The human needs analysis was a prime factor in this development. The result is a program with content and methodology based on a concern for the individual and for what happens to him. In Industrial Arts a common alternative to human needs analysis has been the thing or job analysis approach to content and methodology.

Developmental Tasks are an important consideration in a human needs analysis. Developmental tasks are those achievements and accomplishments which a person must have in order for him to have further personal growth. The literature in the field of Human Growth and Development identifies some developmental tasks of early adolescence.

Developmental Tasks of Early Adolescence

- Establishing independence from adults.
- Establishing behavior based on a strong peer group code.
- Achieving a broadened base of personal experiences.
- Achieving effective use of language and communications.
- Increasing control and use of the body.
- Expanding mental ability from concrete reasoning into abstract reasoning.
- Achieving acceptance of self as a worthy and valuable person.
- Learning to control and test emotions.
- Building and testing a value system.
- Learning to live in an industrial and democratic culture.
- Relating to the opposite sex in an approved manner.

Developmental tasks have served as excellent guide posts for certain educational strategies involved in the Maryland Plan. In addition to the developmental tasks, the program design gave serious consideration to the matters of individual differences, interests, capabilities, and objectives.

MARYLAND PLAN

Point of View: Schools Should Contribute to the Development of Indivioiuals Capable of Living in and Contributing to a Technically and Socially Changing Democratic Society.

The rapid rate of technological progress is changing society in many ways. A society so involved with change needs people who have the mental skills and habits which will enable them to adapt to change.

The school program should develop in students the tools of learning as well as an interest in learning. To this end the Maryland Plan places strong emphasis on developing and using:

- student resourcefulness,
- student problem-solving skills (not limited to laboratory problems),
- student inquiry skills and techniques, and,
- a zest for learning

The student's use of good procedures, productive informational sources, and effective methods of acquiring knowledge and solutions to problems has assumed increasing significance. This does not mean that what the student learns is insignificant.


Edgar Dale

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Today, with the complex technological advancement of industry and its involved organizational structure, there has developed a need to produce citizens who understand its purposes, organization and operation and its impact on our way of life.

Dean B. Bennett

Today's students will soon be voting citizens and required to make important decisions about political, social, and economic matters. They will need knowledge and understanding about the forces which effect these matters in order to make intelligent decisions. The industrial complex is one of the dominant forces in modern society. The **Maryland Plan** provides students with opportunities to learn about the industrial complex and become familiar with the role of industry and its technology in society.

The School Program Carries the Main Responsibility for Preparing Citizens to Meet Society's Requirements and Expectations:

- Social Responsibility
- Economic Sufficiency
- Self Renewal
- Mobility
- Leadership
- Followership
- Problem-Solving
- Adaptability
- Social, Economic and Political Sophistication

The **Maryland Plan** has been designed to fulfill the potential of Industrial Arts as a vital element in developing citizens who have the above characteristics.

The goal of education must be self-actualization, the production of persons willing and able to interact with the world in intelligent ways.

Arthur W. Combs

MARYLAND PLAN

Point of View: The Teacher Should be a Manager of Education, Rather Than the Source of all Information.

The teacher is no longer considered to be a dispenser of facts or the possessor of all knowledge. He is viewed as a manager of education who is involved in facilitating, stimulating, reinforcing, guiding, and evaluating. His task is getting the best out of people and helping them to grow.

The basic element of desirable in-class experiences is a teacher who accentuates intellectual curiosity and creativeness and who is concerned with building the kind of work group where each pupil feels worthy and wanted.

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- to emphasize the students' worthy accomplishments;
- to guide students who need assistance in the solution of problems;
- to encourage student creativity;
- to assist students to recognize ways of refining their techniques of researching, constructing, communicating, analyzing, problem-solving, etc.; and
- to help students to evaluate their own efforts and achievements.

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MARYLAND PLAN

Point of View: The Characteristics of the Teacher.

- He must have faith in the intelligence of youth.
- He must conceive education as an organismic process and not a splintered atomistic series of exercises.
- He must place procedures, inquiry, and discovery above the production of things and the memorization of isolated facts.
- He must conceive his role as one of stimulation, guidance, evaluation and facilitation.
- He must have a mode of thinking that is positive in the approach to problems This is in direct opposition to the way of thinking that searches for reasons why things cannot be done.
- He must exemplify in his discussions and interaction with students an attitude that will stimulate new levels of refinement in the student's procedures, research, and reporting.
- He must become informed of new technological, sociological, and research developments.
- He must be broad in his perspective as to the kinds and forms of tasks a student may perform.
- He must have the ability to move from dominant to supporting roles as necessary.

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In the schoolroom the motive and the cement of social organization are alike wanting . . . the tragic weakness of the present school is that it endeavors to prepare future members of the social order in a medium in which the conditions of the social spirit are eminently wanting . . . . the school itself should be made a genuine form of active community life, instead of a place set apart in which to learn lessons.

John Dewey

MARYLAND PLAN

Point of View: The Educational Environment Should Have Limitless Boundaries and Facilitate Communicating, Socializing, Using Informational Resources, Creating, and Experimenting.

The educational environment should extend far beyond the classroom. Today's far-reaching methods of transportation and communication permit the educational setting to extend beyond the school to the local, state, national, and international communities. In addition to having limitless boundaries, the environment should make possible many educational activities and experiences.

The Educational Environment Should Make It Possible For:

- an exchange of ideas and information through a variety of effective media.
- communication between the student and the teacher in an atmosphere that is free of the fears of challenge but not free of challenge itself.
- communication between students so that they may contribute to the efforts of each other.
- communication between the student and the informational resources in the school, local, state, national, and international communities.
- involving students in cooperative student-directed activities.
- involving students in life-like interaction.
- accommodating many of the social tasks of student development.
- meeting the students' informational needs.
- responding to students with widely varied interests and abilities.
- broad and limitless exploration by the student.
- promoting the development of new and original ideas.
- providing a wide range of activities and materials through which the student may express himself.
- students to integrate their unique skills and knowledge in purposeful experiences.
- students to test ideas.
- students to test hypotheses in the solution of problems.
- students to test materials and equipment for their utility.
- students to experience a variety of social and functional roles.

MARYLAND PLAN

Point of View: Industrial Arts Content Should Be Derived From Industry, Technology, and Their Implications For Man and Society.

The content involved in the Maryland Plan is called out only by general areas rather than by a detailed break-down of area components. The program was designed with this characteristic so that it might better meet the varied needs, interests, and objectives of the students. It is not intended that every student will learn the same facts or have the same experiences. However, each student through his unique learning and experiences will become informed about the prescribed general area of content. The emphasis on general areas rather than on broken-down specifics greatly reduces the chances of concentrating on information which may become obsolete in the student's life-time.

The content developed in the Maryland Plan gives meaning and life to the form of Industrial Arts that is described in the following adaption of Gordon Wilber's definition:

Industrial Arts as a curriculum area is designed as those phases of general education which deal with technology – its evolution, utilization, and significance; – with industry – its organization, materials, occupations, processes, and products; – and with the problems and benefits resulting from the technological and industrial nature of society.

A careful reading of the preceding definition of Industrial Arts enables one to find three major elements of Industrial Arts content. They are TECHNOLOGY, INDUSTRY, and THE RELATIONSHIP OF TECHNOLOGY and INDUSTRY TO MAN and SOCIETY. These three elements are the heart of the Maryland Plan content. The content of the program may be briefly described as:

- the evolution, utilization, and significance of TECHNOLOGY in the areas of transportation; communications; tools; machinery; power generation; and, energy storage and conversion.
- the aspects of INDUSTRY which pertain to organization, management, materials, finance, occupations, processes, products, and problems.
- the societal problems and benefits resulting from technology and industrial enterprise.

The terms **technology** and **industry** are frequently used by people in and outside the field of Industrial Arts. In order to establish a common understanding of these terms as they are used in this text, the following definitions are presented:

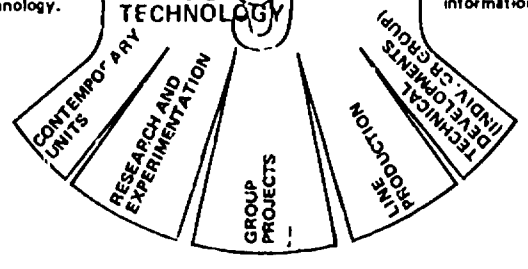
TECHNOLOGY – The utilization of materials, tools, machines, human ability, and knowledge for the purpose of changing man's life and environment.

INDUSTRY – A system by which materials, tools, machines, human ability, and knowledge are organized and utilized for the purpose of changing man's life and environment.

The Junior High School Program in Industrial Arts

. . an emphasis on the psychological and sociological needs of the individual as well as his resourcefulness and capabilities.

CONTENT The study of certain basic elements common to all civilized mankind and their contributions to the growth of civilization	7 ANTHROPOLOGICAL STUDY OF TECHNOLOGY	**APPROACH** "The Unit Method" Units 1. Tools and machines 2. Power and energy 3. Transportation and communication
CONTENT 1. An in-depth study of a raw materials processing industry. 2. An in-depth study of high volume production industries.	8 CONTEMPORARY STUDY OF INDUSTRY	**APPROACH** "The Group Process" 1. The Group Project Method 2. The Line Production Method
CONTENT Increased depth in study of modern industry and contemporary technology.	9 CONTEMPORARY STUDY OF INDUSTRY AND TECHNOLOGY	**APPROACHES** Selected according to student needs and informational objectives.



The Maryland Plan for a junior high school program in Industrial Arts should not be called, "A plan for the organization of Industrial Arts content." This statement would be only a partial description since content organization is not the entire program. The program also involves specific teaching methodology. It is the blending of the selected teaching methodology with the content that produces the Maryland Plan.

The program is designed to transpose the points of view presented on preceding pages (regarding the development of the individual, and content for Industrial Arts) into realistic educational practice.

The schematic representation of the Maryland Plan to the left provides an introduction to the program's general content sequence and methodology. Each of the three phases (for grades 7, 8 and 9) will be introduced in the following pages.

An anthropological or historical study of technology is identified as the starting point of this program for the seventh grade. This placement is appropriate because it enables the student to learn how and why western civilization came to be highly industrialized — a seemingly good understanding to grasp before studying contemporary industry. An Objective of the 7th grade phase is to contribute to the students' knowledge about technological developments, the factors influencing technological development, and the subsequent influence of these developments on society.

The approach to instruction in this phase of the program is the "Unit" method. Learning theorists have found that the "Unit" approach is effective at reaching a variety of levels of student interest and ability.

THE 7TH GRADE PHASE AN ANTHROPOLOGICAL STUDY OF TECHNOLOGY

The development of technology may be studied under three broad and comprehensive unit topics. Each unit topic deals with significant elements of technology. These unit topics are:

The Development of Tools and Machines and Their Contribution To the Growth of Civilization.

The Development of Transportation and Communication and Their Contribution To the Growth of Civilization.

The Development of Power and Energy and Their Contribution To the Growth of Civilization.

In the Unit study each student selects an area (sub-topic) that falls under the unit topic chosen by the class. (The water turbine is an example of a sub-topic under the unit topic dealing with power and energy). The students are involved in three areas of activity. They engage in the pursuit of information, project construction, and the sharing of information through the group seminar.

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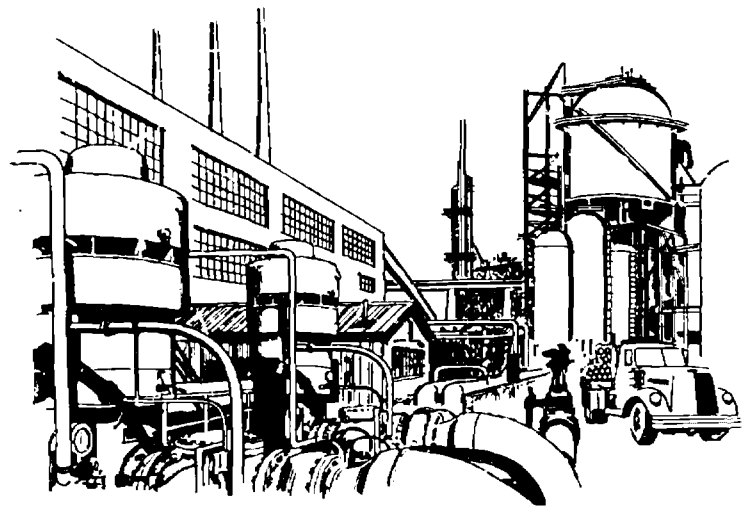
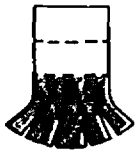


educational program provides an opportunity for students to compare their management role-playing functions and responsibilities to those in actual industry. The educational program brings to the students information about the industry under study and various other appropriate aspects of industry. Films, guest speakers, field trips, and student reports are all part of the educational program.

High-volume production industries are studied through an actual line production experience. The class organizes a company with a management structure based on the management organizations of high-volume production industries. Management role-playing is necessary for the class to succeed at producing and marketing a product. Following the selection of an item for production, the class effort is directed towards the activities of designing the product, production line planning, designing and fabricating jigs and fixtures, training of personnel, advertising, and other role-playing and construction activities. The raising of capital is a significant part of this experience. It is accomplished through the issuance of stocks. The staff meetings, special meetings, and special management programs that are a part of the Group Project experience are also significant elements of the Line Production experience.

At the ninth grade level the teacher and students may select an instructional program which is best suited to student needs and learning objectives. They may select one or a combination of up to five instructional procedures. The three instructional methods previously explained (Unit Studies, the Group Project, and Line Production) may be utilized by ninth graders but with variations in the content. Ninth grade Unit Studies may focus on either modern industry or contemporary technology. The Group Project may be used to study a specific industry, or it may be used to study an area of contemporary technology. The Line Production experience has the same type of content that it has in the eighth grade, but with increased depth of learning and greater sophistication in student performance. The other two approaches available to ninth graders are Research and Experimentation and Technical Development. These latter two instructional procedures are introduced below.



THE 9TH GRADE PHASE
A STUDY OF CONTEMPORARY INDUSTRY AND TECHNOLOGY

Research and Experimentation

Research and Experimentation in the junior high school is recommended for the above average student. Each student selects his own problem for researching, testing, experimenting, and solving. The problem may pertain to industrial products, industrial processes, recent technological developments, or even original invention on the part of the student. After selecting a problem the student begins an investigation and collection of information. He becomes sufficiently familiar with the problem to devise and plan appropriate tests and experiments to solve it. This includes the designing and constructing of the apparatus necessary for obtaining test data. Primary objectives of this experience are to have the student develop and refine his analytic abilities, communication skills, and problem-solving techniques.

Throughout the Research and Experimentation experience each student is given opportunities to inform the class of his progress, to discuss his research and construction problems, to exchange ideas, to share sources of information, to challenge the

work of others, and to have his own work challenged. These opportunities arise informally in class and at periodic formal student directed seminars.

Technical Development

Technical Development activities provide opportunities for a student to choose a technical area in which he would like to develop knowledge and skills. His choice may be influenced by occupational interests, hobbies, or other interests. Examples of technical areas chosen by students include photography, radio communications, metallurgy, graphics, lasers, energy storage, etc. Students involved in Technical Development enjoy freedom to experiment, construct, research, test, and engage in many other activities. Their activities are limited only by their interests, abilities, objectives, and available resources. Many students work independently, however, students of similar interests may choose to work together in a technical area.

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