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GUIDELINES FOR VOCATIONAL AGRICULTURE.
MARYLAND STATE DEPT. OF EDUCATION, BALTIMORE

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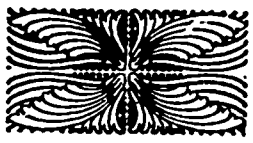
DESCRIPTORS- *VOCATIONAL AGRICULTURE, CURRICULUM, CURRICULUM DEVELOPMENT, *PROGRAM DEVELOPMENT, EDUCATIONAL OBJECTIVES, *GUIDELINES, *CURRICULUM GUIDES, AGRICULTURAL OCCUPATIONS, MARYLAND,

AREAS OF TRAINING WHICH ARE OFFERED IN THE VOCATIONAL AGRICULTURE DEPARTMENTS OF MARYLAND ARE PRESENTED IN THIS DOCUMENT. AGRICULTURE TEACHERS AND ADVISORY GROUPS MAY SELECT AREAS OF TRAINING FROM THE TOPICAL OUTLINE OR ADD NEW AREAS AS NEEDED IN THE LOCAL INSTRUCTIONAL PROGRAM. PHILOSOPHY, SPECIFIC OBJECTIVES, GROUPS SERVED, AGRICULTURAL TRENDS AND CHANGES, AND CAREERS AND OCCUPATIONS AS BASES FOR COURSE PLANNING ARE DISCUSSED. BRIEF EXPLANATIONS OF THE COURSES, DIAGRAMS OF POSSIBLE COURSE FORMATS, AND TOPICAL COURSE OUTLINES ARE GIVEN FOR GRADES NINE THROUGH 12. SAMPLE COURSE OUTLINES ARE GIVEN FOR SPECIAL AREAS OF INSTRUCTION IN AGRICULTURAL CHEMICALS AND ORNAMENTAL HORTICULTURE. AN EXAMPLE OF LESSON PLANNING, SUGGESTED SUMMER PROGRAM ACTIVITIES AND REFERENCES ARE INCLUDED. (WB)

GUIDELINES FOR VOCATIONAL AGRICULTURE



Maryland State Department of Education
September, 1966

FOREWORD

This guide is designed to present the areas of training now available in the Vocational-Agriculture departments in the State of Maryland. Since the guide is general in nature, it is expected the agriculture teacher will include in his course of study greater detail to show complete involvement of the teaching units.

The agriculture teacher and his advisory group may select areas of training from this topical outline or insert new, emerging areas of instruction as they desire. It is an educational must that we have the most modern curriculum possible. This, in itself, is a challenge to all agriculture teachers since agriculture is being subjected to constant, scientific change. If this guide can assist the updating of the Vocational-Agriculture departments across the State, its true purpose will be accomplished. The guide is designed to assist in the development of the philosophy and objectives of Vocational Agriculture and to assist the people its instruction may serve. Suggested course formats are included to show the class scheduling possibilities for a principal or teacher to follow, and also a general explanation of the areas to be taught on the various grade levels. Plans for the possibility of modifying the agricultural course to meet the needs of college-bound students and other agricultural occupations are suggested. The instruction of adults in advanced agricultural training also must be given consideration. Interest in agriculture in this State can be served by properly trained Vocational-Agriculture teachers if adequate facilities and well-equipped departments are made available.

To the many county vocational supervisors, principals of secondary schools, vocational-agriculture teachers, and others who gave of their concepts, desires, and recommendations to build a stronger program for Vocational Agriculture within the State of Maryland, the Supervisor of Vocational Agriculture, Glenn W. Lewis, is most grateful.

CONTENTS

A PHILOSOPHY OF VOCATIONAL AGRICULTURE

We believe that—

Vocational Agriculture can serve all youth and adults who have interests and ability in agricultural endeavors;

Vocational Agriculture supports the complete function of the comprehensive high school or area school;

the knowledge and traits of good citizenship are identified, defined, and practiced daily in the lives of all youth and adults in the school and community;

the responsibilities of citizenship must be supported by each youth and adult as a vital part of his education and life in his community;

the FFA organization can serve as an effective means of molding and developing leadership, desirable character traits, and the integrity of youth in our schools and community;

it is the responsibility of the Vocational-Agriculture teacher to plan, organize, and administer effective programs and activities that meet the felt and the newly-discovered needs of youth;

Vocational-Agriculture courses and curriculum content are designed to attain predetermined goals and objectives which are periodically evaluated;

the Vocational-Agricultural program is student-centered and designed with organized activities, problems, and situations as units of instruction which must be satisfactorily solved by the students;

learning by doing is used as an effective method of practical instruction and made applicable to situations in Vocational Agriculture;

creative action should be developed within each individual with interests and goals developed to the maximum;

Vocational Agriculture should provide occupational information and practice for youth who have shown an interest in Vocational Agriculture and in related fields;

the Vocational-Agriculture teacher stands ready to assist any individual at any time in solving problems related to agriculture or in advancing the cause of agriculture;

the teacher and his program should prepare youth and adults for entering the world of work by familiarizing the individual with condi-

tions of human relations, business environment, and requirements and characteristics of the different kinds of occupations;

the importance of each individual should be given due consideration by providing encouragement and instruction that would advance his interests and talents, thus enabling him to reach maximum achievement, success in school and in the community in which he will live and work;

the areas of instruction should be clustered for the purpose of giving depth in concepts and development of competences;

long range planning and goals for the individual should be built within the framework of the curriculum so as to give the student new horizons to achieve;

the students should be aware of living in a world of constant change, willing to accept criticisms that result from modern living.

SPECIFIC OBJECTIVES OF VOCATIONAL AGRICULTURE

It is fundamental to the program of instruction in vocational agriculture in any school that it be based on the needs and interests of individuals and groups served. It should be realistic in the light of actual existing or anticipated opportunities for gainful employment, and it should be taught within the limits of the individual's ability to benefit from such education.

The purposes of vocational agriculture in the public schools are twofold—to contribute to the broad educational objectives of the public school system and to provide education needed for employment in agriculture.

In keeping with the above purposes, a good vocational agriculture program contributes to the following objectives:

1. To provide basic education for high school youth who will later go into agricultural business occupations requiring an agricultural background, knowledge, skills, and abilities common to both agriculture and industry;
2. To provide basic education in agriculture for high school youth who plan to engage in some type of production agriculture or who now live on farms;
3. To assist with the occupational and vocational guidance of high school youth;
4. To provide an opportunity for high school youth to develop the knowledge, skills, and abilities required to gain proficiency in general shop and agricultural mechanics;
5. To provide instruction that will better prepare students for post-high school training in area schools, technical schools, colleges, and universities;
6. To develop responsibility, leadership, citizenship, and cooperation through the teaching of the life sciences and the social sciences;
7. To complement the broad educational objectives of the public school system by making practical and intellectually appealing applications of the academic subjects, particularly science, mathematics, and economics, as they relate to the problems of the agriculture student;

8. To give continuing post-high school training or retraining to employed agricultural business workers who need to upgrade their present skills or learn new skills;
9. To give instruction in post-high school courses to youth and adults who need or desire training or retraining either for full-time or part-time employment in production agriculture;
10. To provide meaningful vocational instruction, with practical application to the problems of youth, thereby encouraging all students to stay in school until graduation.

GROUPS SERVED BY VOCATIONAL AGRICULTURE

1. In-school youth who plan to farm.
2. In-school youth who engage in part-time farming.
3. Youth who want or need agricultural education preparatory to continuing their study in area schools, technical schools, colleges, and universities.
4. Youth who want or need to further their vocational maturity through the responsible leadership, citizenship, cooperative and self-discovery experiences provided by vocational agriculture.
5. Youth who want or need experiences in applying to practical situations the knowledge learned in mathematics, science, economics, and other academic subjects.
6. Youth who could find a motive and a challenge to remain in school by applying their learned vocational skills and aptitudes.
7. Youth who need personal assistance and guidance in selecting an agricultural occupation.
8. Post-high school youth and adults who are engaged in full-time or part-time farming.
9. Post-high school youth and adults who are employed in some agricultural business and who need to upgrade their present skills or learn new skills.
10. Youth and adults who plan to engage in some agricultural business occupation.
11. Adults who want avocational courses such as gardening, animal science, home beautification, and home mechanics.

12. Youth and adults who did not finish high school and who could benefit from training in agriculture by finding employment in some agricultural occupation.
13. Youth and adults with socioeconomic handicaps.

AGRICULTURAL TRENDS AND CHANGES IN MARYLAND

Agriculture today is one of the nation's most basic and most important industries. It is the major source of food, feed, and fibre. It will continue to occupy a key role in our overall economy.

Successful, modern-day agriculture is a highly diversified, efficiently operated, and dynamic industrial complex. Agriculture today, as in the past, is vitally concerned with the production, processing, and distribution of food, feed, and fibre. Successful modern agriculture is based predominantly on sound scientific technology and operated on sound principles of business. Within the past few years the scope of the industry of agriculture has been expanded to include also the many businesses that process, market, and distribute agricultural products, as well as the farms that produce these products. It further includes the businesses that provide agricultural supplies and services needed for production.

The need for adequately trained workers throughout the agricultural industry is increasing, although there has been some recent decline in the number of farms. For every one worker on the farm, three workers need to be engaged in related agricultural work off the farm.

Although one of the major objectives of vocational agriculture has been, and still is, training for proficiency in farming, increased emphasis is being placed on training individuals for employment throughout the total industry connected with agriculture.

A review of current agricultural trends indicates that our way of life is changing all the time. These changes have many implications for vocational agriculture. Some of the more obvious ones are:

1. The job of preparing boys to engage in farming is still of major importance, but it is a more complicated and difficult job than ever before.
2. In many communities the vocational agriculture program will need to give more attention to many people with two jobs—farming and employment in a nearby industry.

3. Emphasis will need to be placed on training for jobs in agriculturally related businesses. Requirements for entry and advancement in these jobs will demand that prospective workers have background experience and training in agriculture. Vocational agriculture can help satisfy that demand by preparing individuals for employment throughout the industry of agriculture.
4. Vocational agriculture must offer increased opportunities for making the life sciences and other subjects more meaningful to many students. Biology, physics, mathematics, economics, English, and other subjects should be so related to the projects and problems of vocational agriculture that students can see their meanings in true-to-life situations. Modern agriculture is largely a matter of applied science and business principles. Therefore, much of the organized body of knowledge in modern agriculture is deeply rooted in basic principles of plant and animal science, earth science, physical science, and mathematical science.
5. Because of the nature of their particular future employment and since all agricultural education needs of youth and adults may not be met at one level of education, some students may enroll in post-high school training, while others can be further trained through adult retraining or refresher courses. Vocational agriculture in high school must continue to serve as preparatory training for students who later will enroll in area schools, technical schools, colleges, and universities.
6. Farming is changing so dynamically that much of the vocational training in agriculture will have to be directed to the young farmer, the adult farmer, and the individual by using on-the-farm instruction.
7. Boys now living on the farm will need continuing education in scientific agriculture to develop further their farming programs or to prepare them for employment with any agricultural business in which they may desire to use their competences.
8. The leadership training purposes of the youth organizations will suit the needs of the agriculture students regardless of their occupational choices.
9. In the advanced vocational agriculture courses the student should be placed for supervised work experience in the type of agricultural occupation in which he expects to become engaged. This

experience can be acquired through supervised practice programs conducted either on the farm or on the job, under the supervision of the teacher. This supervised practice will provide opportunities for practical application of information learned in organized classes and will enable the student to gain more skills and more proficiency in management.

10. Since instructional time is limited, even in a four-year vocational agriculture course, and it is difficult to teach all desirable agricultural information during that time, the instructional material should be organized into units of larger blocks of time so that the learner may better acquire basic understandings that will enable him to solve agricultural problems as they arise.
11. As provided for in the Vocational Education Act of 1963, vocational agriculture will need to be adapted and made available to train people with special educational needs who could engage in agricultural occupations.

SOME CAREERS IN AGRICULTURE

Listed below are some of the careers presently available in agriculture:

AGRICULTURAL OCCUPATIONS

Agriculture Salesman

- Feed (animal)
- Seed (plant)
- Fertilizers
- Agricultural, chemical
  1. Herbicide
  2. Insecticide
  3. Fungicides
- Meat
- Vegetables
- Livestock
- Vaccines (animal)
- Vaccines (poultry)
- Farm machinery
- Equipment
- Fruit trees and shrubbery
- Insurance

Production Agriculture

- Truck crops
- Tobacco
- Dairy
- Poultry
- Beef
- Swine
- Sheep
- Orchard operator
- Nurseryman
- Forestry
- Farm manager
- Farm owner
- Farm tenant
- Farm labor
- Contract farming

Agricultural Services

- Dairy herd improvement operator
- Agricultural credit adviser
- Poultry adviser
- Dairy adviser
- Beef adviser
- Swine adviser
- Produce production adviser
- Produce marketing adviser
- Produce processing adviser
- Produce packaging adviser
- Produce wholesaling adviser
- Forester
- Soil conservation adviser
- Livestock breeding representative
- Agricultural insurance man
- Spray service man
- Seed cleaning man
- Feed grinding and mixing operator
- Cannery crop field man
- Produce grading and standardizing man
- Feed mill manager
- Feed mill mixer operator
- Hatchery operator
- Hatchery worker
- Operator-demonstration plots
- United States Department of Agriculture food grader
- Milk collector
- Extension service employee
- Vocational-Agriculture teacher

Agricultural Mechanics

- Agricultural building contractor
- Mason
- Hot metal operator
- Cold metal operator
- Sheet metal worker
- Drainage supervisor
- Small gas engineer
- Farm machine mechanic
- Agricultural electrician
- Acetylene arc welder

Agri-Business Employment

- Feed mill company
- Farm machinery company
- Agriculture accountants
- Seed company
- Fertilizer company
- Garden centers
- Landscape gardeners
- Propagationist
- Processing
  1. Meats
  2. Tomatoes
  3. Cucumbers
  4. Corn (sweet)
  5. Peas
  6. Limas
  7. Sweet potatoes
  8. Fruit
- Canning
- Labeling
- Packaging
- Milk processing
- Egg processing
- Wool processing
- Tobacco processing
- Floriculture

THE INSTRUCTIONAL PROGRAM IN VOCATIONAL AGRICULTURE

The details of the exact instructional program for each Vocational-Agriculture department should be determined locally by the teacher, with assistance from advisory committees, students, parents, farmers, faculty, and others. It should be based on the needs of the students enrolled, the existing agricultural situation in the school's community, agricultural trends, and the possibilities for students' supervised practice programs. The material outlined in this bulletin provides for four years of instruction in Vocational Agriculture. Since some schools offer only three-year courses of study, the instructional content for different years will often vary among departments from that which is suggested in this bulletin. However, in general a student who takes all four years of instruction has the chance to receive the best possible high school training in production agriculture or agricultural business.

Below are brief explanations of the courses in each of the four years of Vocational Agriculture: Animal Science, Plant Science, Agricultural Mechanics.

Ninth Grade—Animal Science, Soil and Plant Science, Agricultural Mechanics.

Vocational Agriculture is exploratory in nature and should be termed Basic Applied Agricultural Science. This basic course is related to both rural and urban life. It should deal with origins, structures, and functions of living things and include the study of the basic, biological, earth, and social sciences.

Agriculture career opportunities, leadership programs, and record keeping should be introduced at this level.

The instruction and practice received in agricultural mechanics should involve primarily the teaching of skills, techniques, identification, and proper use of agricultural equipment and tools. Approximately 40 per cent of the school year should be devoted to this phase of the program.

Tenth Grade—Animal Management, Agronomy and Vegetable Production, Agricultural Mechanics.

The course is designed to convey understanding, scientific knowledge, and the skills and techniques involved in the production and processing of plants and animal products. This applied agriculture course of study deals

with understanding of scientific knowledge, skills, and techniques involved with man's production and utilization of all plants and animals, and the conservation of natural resources.

The agricultural mechanics course should be designed to complete the competence needed by the student and not covered in grade nine. It is planned that, by learning advanced skills and techniques and shop understanding, the student will master the fundamentals of basic agricultural mechanics. Approximately forty per cent of the student's time will be devoted to this phase of our program.

Eleventh Grade—Agricultural Business, Agriculture Mechanics, Other Business Subjects.

This is a two-period course in agriculture and offers instruction in agricultural business and agricultural mechanics. The student pursuing training in production farming should matriculate in both of the above courses. The student having as his goal agricultural business may elect a business subject instead of farm mechanics. The agriculture teacher should inaugurate, operate, and supervise agricultural inservice work programs. Cooperative work programs should be planned by the Vocational-Agriculture teacher to guarantee the student desired educational learning experiences. The student may elect to receive this experience during the summer or the in-school year.

Agricultural Mechanics will involve instruction in major agricultural areas, such as: farm power, small engines, welding, electricity, soil and water management, and agricultural plumbing.

Twelfth Grade—Agricultural Economics, Agricultural Mechanics, and/or Other Business Subjects.

The agricultural management and economics course should pursue pertinent managerial knowledge and abilities needed to operate effectively an agricultural business or enterprise.

Students selecting agriculture business may elect as their second subject an academic or vocational subject rather than agricultural mechanics.

The Agricultural Mechanics course should offer instruction in farm machinery, farm building construction and design, the agricultural uses of concrete, and fence construction.

Special courses, such as, horticulture, floriculture, forestry, agricultural chemicals, special conservation problems, processing, marketing, may be added to the secondary curriculum as the educational need arises.

COLLEGE-BOUND AGRICULTURE STUDENTS

Provisions should be made by guidance counselors to make it possible for college-bound students to elect an agricultural subject when their schedules permit. The student should obtain, in grade nine or ten, basic agricultural knowledge. During grades eleven and twelve, college-bound students should be encouraged to choose academic subjects that meet their needs. The above schedule's flexibility should permit secondary students to prepare adequately for college entry.

ADULT-YOUNG FARMER EDUCATION

Programs will continue to be promoted for adult and young farmers to keep them abreast of new techniques, science, machines, and regulations emerging from the minds of people.

DIAGRAMS OF POSSIBLE VOCATIONAL-AGRICULTURE COURSE FORMATS

Maryland State Department of Education
Diagram of Courses in Vocational Agriculture

(One-Man Department)

	1st Semester		*2nd Semester*
Grade 9		Basic Applied Agricultural Science	
	Animal Science 1. Careers 2. Leadership 3. Record Keeping	Agricultural Shops Skills*	Plant Science
Grade 10	Animal Management	Agricultural Shops Skills*	Agronomy and Vegetable Production

* Agricultural Shop Skills should utilize 40 percent of the year's program.

	School Year *Production Agriculture Program*	*School Year* *Agricultural Business Program*	Summer Cooperative Inservice Program
Grade 11**	Agricultural Occupations	Agricultural Occupations	
	Agricultural Mechanics	Elective Business Subjects	
Grade 12**	Agricultural Economics and Management	Agricultural Economics and Management	
	Agricultural Mechanics	Elective Business Subjects	

** In Grades 11 and 12, vocational agriculture students interested in attending an agricultural college should be encouraged to elect academic preparatory subjects and select agriculture as an elective when scheduling permits.

Agricultural Post-secondary School Education and Agricultural Technical Training for Adults and Out-of-School Youth.

Agricultural Institute—University of Maryland
Adult Education
Adult-Young Farmer Education in Secondary and Area Schools

Summer Pupil Supervised Programs

1. Production Projects
2. Agri-Business Placement
3. On-Farm Placement
4. Agricultural Work-Study Program
5. Improvement Projects
6. Demonstrational Plots
7. School Farm Placement

Maryland State Department of Education
Diagram of Courses in Vocational Agriculture

(Two-Man Department)

	1st Semester	*2nd Semester*		*Summer Pupil Supervised Programs*
Grade 9	Basic Applied Agricultural Science			
	Animal Science 1. Careers 2. Leadership 3. Record Keeping	Agricultural Shops Skills*	Plant Science	1. Production Projects 2. Agri-Business Placement 3. On-Farm Placement 4. Agricultural Work-Study Program 5. Improvement Projects 6. Demonstrational Plots 7. School Farm Placement
Grade 10	Animal Management	Agricultural Shops Skills*	Agronomy and Vegetable Production	*Horticulture Program* Horticulture I

* Agricultural Shop Skills should utilize 40 percent of the year's program.

	School Year *Production Agriculture Program*	*School Year* *Agricultural Business Program*	
Grade 11**	Agricultural Occupations	Agricultural Occupations	Horticulture II
	Agricultural Mechanics	Elective Business Subjects	Summer Cooperative Agri-Business Placement
Grade 12**	Agricultural Economics and Management	Agricultural Economics and Management	
	Agricultural Mechanics	Elective Business Subjects	Horticulture III

** In Grades 11 and 12, vocational agriculture students interested in attending an agricultural college should be encouraged to elect academic preparatory subjects and select agriculture as an elective when scheduling permits.

Agricultural Post-secondary School Education and Agricultural Technical Training for Adults and Out-of-School Youth.

Agricultural Institute—University of Maryland
Adult Education
Adult-Young Farmer Education in Secondary and Area Schools

Maryland State Department of Education
Diagram of Courses in Vocational Agriculture

	1st Semester	*2nd Semester*		*Summer Pupil Supervised Program*
Grade 9		Basic Applied Horticulture		
	Plant Science 1. Careers 2. Leadership 3. Record Keeping	Horticulture Shop Mechanics		1. Horticultural Production Projects 2. Horticultural Agri-Business Placement Garden Center 3. Park, Nursery, etc. Placement 4. Horticultural Work-Study Program 5. Horticultural Improvement Projects 6. Horticultural Demonstrational Plots 7. Horticultural School Grounds Placement
Grade 10		Horticulture I	Summer Cooperative Inservice Program	
Grade 11		Horticulture II		
Grade 12	Greenhouse Management and Floral Display	Horticultural Agriculture Business and Occupational Placement		

Agricultural Post-Secondary School Education and
Agricultural Technical Training for Adults
and Out-of-School Youth

Horticultural Course in Secondary School

TOPICAL COURSE OUTLINES

The sequence in this guide is designed to involve the student with a broad-based experience in the area of agriculture. Maryland has a total of twenty-three thousand productive farms, which are diversified in soil, climate, and topography characteristics. This situation causes the course of study of production agriculture to increase in complexity.

The areas designed for agri-business, forestry, horticulture, agricultural mechanics, economics, and machinery appear more uniform throughout the State in its educational coverage.

This guide is organized to challenge the students as they progress through the secondary school, climaxing with students being prepared to adjust to their employment desires. Special courses may be designed for training in technical areas in agriculture, which would result in increased depth of study by the student.

Technical education may be taught at the university level, in area schools, or as an adult course in the secondary school.

Grade 9, Semester I

INTRODUCTION TO AGRICULTURE AND ANIMAL SCIENCE

Objectives:

1. Emphasize the importance of agriculture in national affairs.
2. Develop understandings of leadership, group organization, and action.
3. Acquaint the student with careers in livestock enterprises.
4. Understand ways and means of improving quality of livestock.
5. Study the animal and its functional processes.
6. Develop animal record-keeping procedures.

Grade 9, Semester I

INTRODUCTION TO AGRICULTURE AND THE FFA ORGANIZATION

Class Program:

1. Orientation to high school program
2. Methods, procedures, and content of Vocational Agriculture course
3. Supervised farming program
4. Getting along with others
5. Educational opportunities after high school
6. Agriculture's contribution to society
7. Understanding life in the country
8. Youth in rural life-youth leadership development
9. Understanding the FFA
   a. Its objectives and purposes
   b. Historical background
   c. Constitution and bylaws
   d. Degrees and awards
   e. The FFA chapter operation
   f. Parliamentary procedure
   g. The program of work
   h. Qualities of a good organizational member
   i. Responsibilities of an FFA member
10. Project record keeping.

Grade 9, Semester I

ANIMAL SCIENCE

Class Program:

1. Locating livestock careers in agriculture
2. Getting acquainted with farm animals
   a. Selecting animal breeds and understanding their characteristics
   b. Selecting fowl breeds and understanding their characteristics

3. Improving herds and flocks
   a. Crossing
   b. Upgrading
   c. Line breeding
   d. Hybrid effect
   e. Judging or selecting ideal animals or fowl
4. Feeding livestock for a profit
   a. Study of digestive systems
      (1) Animal
      (2) Fowl
5. Feeding factors affecting growth of animals
6. Animal metabolism and growth, cell division
   a. Proteins
   b. Carbohydrates
   c. Fats
   d. Minerals
   e. Vitamins
   f. Development of a simple ration—nutritive ratios
7. Caring for livestock and their products
8. Healthy herds and flocks—care and management of an animal
   a. Identifying and controlling animal diseases and parasites
   b. Understanding the function of the respiratory system
9. Study of reproductive systems of animals and fowl
10. Study of the process of milk secretion, eggs, wool, and meat production
11. Selection of an animal project
12. Developing a livestock and crop record system
    a. Understanding the Maryland project record book
13. Promoting wildlife and its conservation of natural resources

Grade 9, Semester II

PLANT SCIENCE

Objectives:

1. Study careers connected with the study of plant science.
2. Understand the process of germination.
3. Be aware of the factors affecting maximum plant growth.

4. Use the techniques for plant improvement.
5. Know the soil and its physical characteristics.
6. Study soil and become aware of the factors that affect its productivity.
7. Advance the student in areas of sound soil and water conservation practices.

Grade 9, Semester II

PLANT SCIENCE

Class Program:

1. Plant science
   a. Locating careers in plant science
   b. How plants affect our lives
   c. Understanding seed and its secrets
   d. Power of germination, osmosis, plasmolysis, transpiration, and photosynthesis
   e. Plant structure and its operation
   f. Plant growth and its importance
   g. Assimilation of food by plants
2. Classification of crop plants
   a. Botanical classification
   b. Use of botanical classification
   c. Classification based on life habit
   d. Agricultural classification
3. Determining factors affecting area where crops are grown
   a. Climate and weather
   b. Physical conditions which determine crop production
   c. Agricultural commodity production areas
   d. Factors determining choice of crops
4. Developing crop sequences or rotation
   a. The meaning of a rotation
   b. The advantage of a rotation
   c. Rotation classified
   d. Crop residues
   e. Barnyard manures and fertilizers
5. Effective tillage procedures
   a. The purpose of cultivation
   b. New techniques in tillage

6. Selecting methods for crop improvement
   a. Reproduction
   b. Reproduction process of the cell in heredity
   c. Genetics as a science
   d. Heterosis or hybrid vigor
   e. Genetics applied to plant breeding
   f. Improvement of crops
   g. Methods of improvement
   h. Crop improvement association
7. Selecting good seed
   a. Plant propagation
   b. Developing a farm or suburban garden
   c. Diseases and insects of plants
8. Establishing and maintaining a farm forest
   a. Trees and pioneers
   b. How a tree grows
   c. Forests and their uses
   d. How climate influences forests
   e. How forests influence climate
   f. Forests in soil and water conservation
   g. Identifying trees
   h. Proper forestry management
   i. Forestry harvesting
   j. Fire control
9. Economic importance of soil and its management
10. What is soil
    a. Origin
    b. Soil profile
    c. Soil characteristics
    d. Soil groups
11. Building and maintaining organic matter in soil
    a. Maintaining and increasing organic matter
    b. Barnyard fertilizer
    c. Mulches
    d. Crop residue
12. Locating plant and animal life in soils
    a. Soil factors affecting animal and plant life
    b. Higher forms of animal life in soils

13. Understanding soil moisture and its secrets
    a. Characteristics and management of soil moisture
    b. Water movement
    c. Classification of soil water
    d. Management of soil water
    e. Relation of soil moisture and crop growth
14. Selecting elements essential to plant growth
    a. Air, water, carbon dioxide, oxygen, and hydrogen
    b. Essential major soil elements
    c. Essential minor elements
15. Controlling soil reaction
    a. Acidity and alkalinity
        (1) Ionization of molecules
        (2) P. H. scale
    b. Soil reaction
    c. Formation of acid and alkaline soils
    d. Soil reaction and plant growth
    e. Soil testing
16. Planning for liming soils
    a. Lime materials
    b. Time and method of application
17. Testing for soil fertility
    a. Reason for soil testing
    b. Soil testing accuracy
    c. Tests for phosphorus, potassium, nitrogen
    d. Taking soil samples
    e. Laboratory soil testing
    f. Soil testing kits
    g. Plant tissue testing
18. Selecting and purchasing commercial fertilizer
    a. Fertilizer application
    b. Use of liquid fertilizer
    c. Kinds of fertilizer
19. Controlling land drainage
    a. Forms of drainage
    b. Designing a drainage system
    c. Maintenance of drainage system

20. Providing irrigation needs and practices
    a. Types of irrigation systems
    b. Planning an irrigation system
    c. Operating the irrigation system
    d. Maintenance of irrigation system
21. Understanding our national soil and water conservation problem
    a. Geological division
    b. Man-made erosion
    c. Erosion in the United States
    d. Our national conservation program
22. Controlling soil and water conservation and management on the farm
    a. Using wastelands
    b. Tree farming
    c. Grassland farming
    d. Terrace construction
    e. Strip cropping
    f. Farm ponds and dams
23. Providing conservation of water and soil in the cultivated field
    a. Increasing water entry into the soil
    b. Kinds of water erosion
    c. Wind erosion
    d. Land judging.

Grade 9, Semesters I and II

AGRICULTURAL MECHANICS

Objectives:

1. Understand safety procedure.
2. Identify and properly use agricultural shop tools.
3. Understand sketches and drawings.
4. Develop skills in woodwork and carpentry.
5. Understand preparation and uses of wood finishing products.
6. Sharpen and care for agriculture shop tools.
7. Understand the uses of rope.

Grade 9, Semesters I and II

AGRICULTURAL MECHANICS

Shop Program:

1. Using safety precautions
2. Planning and equipping a home shop
   a. Selecting a location
   b. Shop arrangement
   c. Selecting and using tools, equipment, and supplies
   d. Arranging the interior and storing tools
   e. Storing supplies and materials
   f. Providing facilities for project activities
3. Sketching and drawing
   a. Making freehand sketches
   b. Making pictorial sketches and drawings
   c. Reading working drawings and blueprints
   d. Making working drawings
   e. Lettering sketches and drawings
   f. Making floor plan for building
   g. Making a bill of material
   h. Writing specifications to accompany drawing
4. Woodwork and farm carpentry
   a. Selecting kinds and grades of lumber
   b. Measuring and marking wood
   c. Sawing wood with handsaw
   d. Planing and smoothing wood
   e. Boring and drilling holes in wood
   f. Fastening wood
   g. Shaping curved and irregular surfaces
5. Care and maintenance of the circular saw
   a. Adjusting the circular saw
   b. Ripping with the circular saw
   c. Crosscutting with the circular saw
   d. Performing other sawing operations
      (1) The portable electric saw
      (2) The radial-arm saw
      (3) The band saw

6. Care and maintenance of the jointer
   a. Adjusting the jointer
   b. Using the jointer
   c. Sharpening and adjusting jointer knives
7. Painting, finishing, and window glazing
   a. Inspecting building for painting failure
   b. Selecting paints
   c. Preparing outside wood surfaces for painting
   d. Applying outside paint
   e. Using stains, varnishes, enamels, and lacquers
   f. Painting metal surfaces
   g. Whitewashing
   h. Selecting, cleaning, caring for brushes
   i. Storing and handling paint safely
   j. Glazing and repairing windows
8. Sharpening and fitting tools
   a. Selecting and using grinders and sharpening stones

Grade 10, Semester I

ANIMAL MANAGEMENT

Objectives:

1. Understand livestock feeding and nutritional needs of livestock.
2. Determine the management procedures used to increase efficient production of livestock.
3. Control diseases and parasites of animals and fowl.
4. Develop procedures of marketing quality animal and fowl products.
5. Be aware of techniques to use in the improvement of animal and fowl.

Grade 10, Semester I

ANIMAL MANAGEMENT

Class Program:

1. Profitable livestock feeding and nutrition
   a. Food nutrients
   b. Composition and classification of feeds
   c. Digestion in ruminants and simple stomach animals
   d. Measuring the value of feeds

2. Profitable pork production
   a. The pork production industry
   b. Selection of feeding and breeding stock
   c. Feeding and management of the breeding herd
   d. Feeding and management of market hogs
   e. Disease and parasite control
   f. Marketing hogs
3. Profitable beef production
   a. The beef production industry
   b. Selection of breeding and feeding stock
   c. Feeding and management of the breeding herd
   d. Feeding and management of stockers and fattening cattle
   e. Buying and selling beef cattle
4. Establishing a profitable dairy herd
   a. The dairy production industry
   b. Selection of breeding stock
   c. Feeding and management of the producing herd
   d. Feeding and management of young dairy stock
   e. Marketing dairy products
5. Controlling cattle diseases and parasites
   a. Keeping cattle healthy
6. Efficient sheep production
   a. Understanding the sheep production industry
   b. Selection of breeding and feeding stock
   c. Feeding and management of the breeding flock
   d. Feeding lambs
   e. Control of diseases and parasites
   f. Marketing sheep and wool
7. Efficient poultry production
   a. The poultry production industry
   b. Selecting chicks and birds for production
   c. Feeding and management of the laying flock
   d. Feeding and management of young chickens
   e. Turkey production and management
   f. Control of diseases and parasites
   g. Marketing poultry products
8. Improving animals through inheritance and reproduction
   a. Reproduction, inheritance and pedigrees in animal breeding

Grade 10, Semester II

AGRONOMY AND VEGETABLE PRODUCTION

Objectives:

1. Understand the geographical placement of farm crops.
2. Be aware of the economical importance of farm crops to our nation.
3. Design management procedures for increasing the efficiency of plant production.
4. Be able to market crops for maximum profit.

Grade 10, Semester II

AGRONOMY AND VEGETABLE PRODUCTION

Class Program:

1. Efficient production of small grains
   a. The groups of wheat
   b. Growing wheat
   c. Oats
   d. Barley
   e. Rye
   f. Buckwheat
2. Corn field, producing 100 bushels of corn per acre
   a. Definition of corn
   b. Importance of corn
   c. Uses of corn
   d. Types of corn
   e. Varieties of corn
   f. Producing the corn crop
   g. Pests of corn
   h. The improvement of corn
   i. Modern corn breeding
   j. Kinds of hybrids
   k. Producing hybrid corn
   l. Why grow hybrid corn
3. The importance and uses of sorghum
   a. Types of sorghum
   b. Botany and characteristics of sorghum
   c. Grain sorghums
   d. Forage sorghums

4. Silage as an animal food
    a. Corn silage
    b. Sorghum silage
    c. Grass or legume silage
5. Production of large seeded legume crops
    a. Soybean
        (1) Selecting varieties
        (2) Soil preparation
        (3) Fertilizing
        (4) Planting
        (5) Cultivating and weed control
        (6) Controlling diseases and insects
        (7) Harvesting and marketing
6. Crops used for forage and pasture
    a. Types of forage crops
    b. Hay and haymaking
    c. Pasture management
    d. Care of permanent pastures
7. Biennial and perennial legumes and their characteristics
    a. Alfalfa
    b. Sweet clover
    c. Red clover
    d. Alsike clover
    e. White clover
    f. Lespedeza
    g. Bird's-foot trefoil
8. Perennial forage grasses and their uses
    a. Timothy
    b. Smooth bromegrass
    c. Orchard grass
    d. Kentucky bluegrass
    e. Bermuda grass
    f. Other important perennial grasses
9. Annual forage crops for animal use
    a. Annual legumes
    b. Crimson clover
    c. Annual lespedeza
    d. Annual forage grasses

e. Sudan grass
f. Management of Sudan grass
g. The millets
h. The small grains

10. Controlling disease and insect pests of crops
    a. Diseases of farm crops
    b. Seed treaters
    c. Insects of grain crops
    d. Corn insects
    e. Insects of small grains
    f. Storage insects
    g. Soil and plant insecticides
11. Controlling and identifying weeds
    a. Weeds differ
    b. How weeds hurt the farmer
    c. Methods of controlling weeds
12. Economics of crop production
    a. The type of farming
    b. Marketing farm products
    c. Types of markets
    d. Federal grades of grain
    e. Wheat grades
    f. Oat grades
    g. Barley grades
    h. Rye grades
    i. Soybean grades
    j. Corn grades
    k. Grades for grain sorghums
13. Efficient production of beans (snap and lima)
    a. Selecting varieties of seed
    b. Preparing the soil
    c. Fertilizing and manuring
    d. Planting and cultivating
    e. Controlling diseases and insects
    f. Harvesting, handling, and marketing
14. Production of corn (sweet)
    a. Selecting varieties and seed
    b. Preparing soil, fertilizing and manuring

c. Planting
d. Cultivating and suckering
e. Controlling diseases and insects
f. Harvesting and grading

15. Production of cucumbers
    a. Selecting varieties and seed
    b. Preparing the seedbed
    c. Planting
    d. Cultivating and thinning
    e. Controlling diseases and insects
    f. Harvesting, handling, and marketing
16. Production of muskmelons (cantaloupes)
    a. Selecting varieties and seed
    b. Preparing the soil
    c. Fertilizing, manuring, and liming
    d. Planting and protecting
    e. Cultivating and thinning
    f. Controlling diseases and insects
    g. Harvesting, packing, and marketing
17. Production of potatoes
    a. Selecting varieties and seed
    b. Preparing the soil
    c. Fertilizing and manuring
    d. Planting
    e. Cultivating and spraying
    f. Controlling diseases and insects
    g. Harvesting, grading, and marketing.
18. Production of sweet potatoes
    a. Selecting varieties and seed
    b. Preparing the soil
    c. Fertilizing and manuring
    d. Growing and caring for slips
    e. Pulling and setting slips
    f. Cultivating and weeding
    g. Controlling diseases and insects
    h. Harvesting, handling, and marketing.

19. Production of tomatoes
    a. Selecting varieties and seed
    b. Preparing the soil
    c. Fertilizing and manuring
    d. Growing and setting plants
    e. Cultivating and pruning
    f. Controlling diseases and insects
    g. Harvesting, handling, and marketing
20. Production of watermelons
    a. Selecting varieties and seed
    b. Preparing the soil
    c. Fertilizing, liming, and manuring
    d. Planting
    e. Cultivating and weeding
    f. Controlling diseases and insects
    g. Harvesting and marketing
21. Establishing a home vegetable garden
    a. Planning and arranging
    b. Cultural practices
    c. Choosing the kinds and varieties to grow
    d. Choosing the kinds of herbs to grow
22. Production of tobacco
    a. Tobacco varieties
    b. Tobacco beds
    c. Field culture
    d. Irrigation
    e. Diseases and physical injuries of tobacco
    f. Insects on tobacco in fields
    g. Tobacco harvesting
    h. Curing
    i. Stripping, grading, and marketing
    j. Rotations and cover crops for tobacco
    k. Tobacco farm management
    i. Calibration of fertilizer and spray equipment
    m. Tobacco organization

Grade 10, Semesters I and II

AGRICULTURAL MECHANICS

Areas: Sheet, Cold, Hot Metal, Plumbing, and Gas Engines

Objectives:

1. Develop skills in soldering and sheet metal work.
2. Understand proper use of equipment and supplies associated with hot, cold, and sheet-metal work.
3. Be aware of supplies and equipment needed for sheet-metal work, hot and cold metal operations.
4. Be able to identify different metals.
5. Develop skills in cold metal work.
6. Be able to work hot metal.
7. Be able to perform pipe work and use plumbing equipment.
8. Be able to lay out a plumbing system.
9. Be able to adjust small gas engines.

Area: Metal Work

1. Soldering and sheet-metal work
   a. Operating a gasoline blowtorch
   b. Cleaning surfaces to be soldered
   c. Applying fluxes
   d. Cleaning, tinning, and using soldering irons
   e. Soldering different metals
   f. Repairing small holes
   g. Patching large holes
   h. Soldering a seam or joint
   i. Repairing tubing
   j. Soldering with welding equipment
   k. Laying out sheet metal work
   l. Cutting sheet metal
   m. Folding and forming joints
   n. Riveting sheet metal
   o. Fastening sheet metal with self-tapping screws
2. Cold metal work
   a. Distinguishing between different kinds of iron
   b. Laying out and marking metal
   c. Cutting with a cold chisel

d. Filing
e. Hacksawing
f. Selecting drilling equipment
g. Drilling holes in metal
h. Bending cold metal
i. Riveting
j. Threading

3. Hot metal work
   a. Selecting blacksmithing equipment for the farm shop
   b. Building and maintaining a forge fire
   c. Heating irons in forge
   d. Cutting with the hardy
   e. Bending and straightening iron
   f. Drawing and upsetting iron
   g. Working tool steel

Area: Pipework and Simple Plumbing

1. Selecting pipe tools for the shop
2. Selecting pipe and pipe fittings for a job
3. Measuring and cutting pipe
4. Reaming pipe
5. Threading pipe
6. Assembling pipe and pipe fittings
7. Using copper tubing
8. Cutting a gasket
9. Removing a section of defective pipe
10. Repairing leaky valves and faucets
11. Repairing pumps
12. Taking care of an automatic water system
13. Installing a simple shower bath

Area: Gas Engines

(One cylinder engines)

1. Principles of gas engine
   a. 4-stroke cycle
   b. 2-stroke cycle
   c. Fuel, ignition, and air

2. Understanding the carburization system
   a. Types of carburetor
      (1) Suction
      (2) Gravity
   b. 2-cycle carburetor
   c. Air cleaner maintenance
      (1) Oil bath
      (2) Dry
3. Understanding the ignition system
   a. Primary secondary circuits
   b. Breaker points
   c. Coil
   d. Condenser
   e. Spark plugs
4. Valves and their maintenance
   a. Grinding seating
   b. Adjust clearance
5. Maintenance
   a. Cleaning
   b. Lubrication of motors
   c. Safety measures for gas engines
   d. Proper storage of an engine

Grade 11, Semesters I and II

AGRICULTURAL BUSINESS

Objectives:

1. Explore the broad bases of employment in agricultural occupations.
2. Develop traits for individual employment adjustment.
3. Understand the importance of human relations in agricultural occupation success.
4. Know how an agricultural business operates.
5. Understand total business operation.

Grade 11, Semesters I and II

AGRICULTURAL BUSINESS

Class Program:

1. Exploring Agri-Business in agriculture
   a. The agricultural industry and you
   b. The agricultural world of work
   c. Opportunities in agricultural occupations
   d. How vocational agriculture helps one choose a career
2. Preparing for employment
   a. Sources of information
   b. Job procurement procedures
   c. Language skills needed
   d. Arithmetic skills needed
   e. Legal information
3. Human relations
   a. Developing a winning personality
   b. Relations with fellow workers
   c. Relations with superiors
   d. Maintaining good relations with employers and customers
4. How businesses are organized
   a. The American enterprise system
   b. Ownership and control
   c. Establishing a business
   d. Capitalization in farming and agricultural occupations
   e. Government regulations and their influence on agriculture
5. How businesses are operated
   a. Basic marketing function—merchandising
   b. Basic marketing function—buying
   c. Basic marketing function—selling
   d. Secondary marketing functions

Grade 11, Semesters I and II

AGRICULTURAL MECHANICS

Areas: Farm Power, Welding, Electricity, Soil and Water Management

Objectives:

1. Be able to identify and know the uses of motor parts.

2. Be able to adjust and maintain farm motors.
3. Be able to operate both arc and oxyacetylene welding apparatus.
4. Develop welding and cutting techniques.
5. Understand electricity and its uses.
6. Understand wiring fundamentals when planning, extending, or maintaining a wiring system.
7. Be able to construct contours, terraces, drainage, and irrigation systems.

Grade 11, Semesters I and II

AGRICULTURAL MECHANICS

Area: Farm Power

Shop Program:

1. History of engines
2. Engine operating principles
3. Identification and function of engines
4. Fundamentals of machines
5. Fuels and principles of combustion
6. Fuel system
7. Valves
8. Controlling engine speed
9. Clean air for engines
10. Igniting the fuel charge
11. Electrical accessories
12. Cooling the engine
13. Lubricating oils and greases
14. Lubricating system
15. Clutches, transmissions, differentials, and final drive
16. Belt pulley, PTO shaft, steering gear, and brake
17. Hydraulic system
18. Safe tractor operation

Area: **Welding**

1. Identifying metals
2. Handling metals in welding
3. Arc welding
   a. Selecting arc welding equipment
   b. Operating the arc welder
      (1) Butt welding
      (2) Fillet welding
      (3) Vertical, horizontal welding
      (4) Welding cast iron
      (5) Special arc welding repair techniques
      (6) Cutting steel and cast iron with the arc welder
      (7) Hard surfacing
4. Oxyacetylene welding and cutting
   a. Oxyacelytene welding equipment
      (1) Operating oxyacetylene welding and cutting equipment
      (2) Fusion welding
      (3) Bronze welding
      (4) Hard surfacing equipment
      (5) Cutting with oxyaceltylene
      (6) Brazing of aluminum, copper, and brass

Area: **Electricity**

1. Importance of electricity
2. Sources of electricity
3. Electrical terms
4. Planning the wiring system
5. Providing an adequate service entrance
6. Wiring fundamentals
7. National electrical code
8. Extending wiring systems
9. Maintaining a wiring system
10. Selecting electric motors
11. Motor types
12. Electric motor construction
13. Installing motors, controls and protection
14. Maintaining electric motors
15. Repairing electric motors

Area: **Soil and Water Management**

1. Contouring
   a. Purpose of contouring
   b. Determining contour lines
   c. Strip cropping
   d. Laying out contour lines
   e. Establishing contour lines
   f. Grassed waterways
2. Terracing
   a. Purpose of terracing
   b. Planning a terrace system
   c. Determining terrace lines
   d. Terrace outlets
   e. Constructing terraces
3. Farm drainage
   a. Purpose of drainage systems
   b. Kinds of drainage
   c. System of the drains
   d. Slope of drains
   e. Tile size
   f. Trenching
   g. Tile outlet
   h. Drainage maintenance
4. Irrigation
   a. Importance of farm irrigation
   b. Irrigation water requirements
   c. Types of irrigation
   d. Flooding from field, lateral
   e. Border method of irrigation
   f. Establishing ditches
   g. Irrigation structure and equipment

Grade 12, Semesters I and II

AGRICULTURAL ECONOMICS AND MANAGEMENT

Objectives:

1. Establish the individual in an agricultural occupation.
2. Plan for advancement in the agricultural occupation.
3. Improve the farm or agricultural business.

4. Make maximum use of all resources connected with the agricultural enterprise.
5. Understand the pressures affecting the welfare of agriculture.

Grade 12, Semesters I and II

AGRICULTURAL ECONOMICS AND MANAGEMENT

Class Program:

1. Planning a career in agriculture
   a. Decision in agricultural management
   b. Agriculture as a business and a way of life
   c. Personal qualifications for farming and agri-business
   d. Getting started in agriculture
2. Planning the agricultural and farm business
   a. Deciding personal goals
   b. Determining volume of agricultural business
   c. Financing the agricultural business
   d. Selecting the agricultural business
   e. Ways of getting established in agriculture
   f. Study of agricultural records and accounts
   g. Planning the agricultural business
3. Making maximum use of power machinery and equipment
4. Using labor efficiently and effectively
5. Using facilities efficiently
6. Marketing agricultural products
7. Adjusting the farm or agri-business to meet changing needs
8. Agriculture in today's world
   a. Legal problems of the agriculturalist
   b. Farm and agri-business organizations
   c. The agriculturalist and his community
   d. Government agricultural regulations
   e. National agricultural policy
9. Improving the farm and agricultural business
   a. Surveying a farm or business and land judging
   b. Analyzing the farm and agri-business
   c. Improving the farm and agri-business
   d. Planning the crop-animal commodities and services of agriculture

Grade 12, Semesters I and II

AGRICULTURAL MECHANICS

Areas: Farm Machinery, Agricultural Buildings and Concrete Usage, and Fence Construction

Objectives:

1. Be able to select machinery needed to operate the agricultural enterprise.
2. Use and maintain equipment properly.
3. Be able to adjust and repair agricultural equipment.
4. Be able to lay out a foundation for a farm building.
5. Be familiar with building designs, costs, and advantages.
6. Become familiar with building materials used in agricultural construction.
7. Make concrete mixtures.
8. Understand possible agricultural uses of concrete.
9. Be able to lay cinder and concrete block.
10. Construct agricultural fencing.

Grade 12, Semesters I and II

Area: Farm Machinery

Shop Program:

1. Selecting farm machinery
   a. History of farm machinery
   b. Determining quality of farm machinery
   c. Life of farm machinery
   d. Factors in selecting farm machinery
   e. Cooperative purchase of farm machinery
2. Using and maintaining agricultural machinery
   a. Care and maintenance of machinery
   b. Preventative maintenance
   c. Machine lubrication
   d. Operation of farm machinery
   e. Repairing farm machinery
   f. Identifying machinery parts
   g. Setting up a parts department

h. Disassembling and inspecting machine
i. Maintenance and replacement of broken parts
j. Assembly an dadjustment of machinery
k. Painting machinery
l. Storing machinery
m. Maintenance of farm machinery

3. Proper care of farm machinery
   a. Row planter
   b. Grain drill
   c. Plows
   d. Harrows
   e. Disks
   f. Cultivators
   g. Mowers
   h. Forage harvester
   i. Balers
   j. Combines
   k. Corn pickers and shellers
   l. Sprayers
   m. Spreaders
   n. Milking equipment

Area: Agriculture Buildings and Concrete Usage

1. Agriculture buildings
   a. Preliminary planning of facilities
   b. Building materials
   c. Layi. g out a foundation
   d. Cutting rafters
   e. Determining size of rafters
   f. Constructing pole frame building
   g. Constructing clear span building
   h. Roofing materials
   i. Repairing and protecting buildings.
   j. Rodent proofing buildings
   k. Paints and preservatives
2. Concrete usage
   a. Composition of concrete

b. Ingredients for making concrete
c. Concrete mixture
d. Water-cement relationship
e. Determining quantity of materials needed
f. Mixing concrete
g. Placing concrete
h. Finishing the surface
i. Curing concrete
j. Forms for concrete
k. Reinforcing concrete
l. Removal of forms
m. Making water-tight concrete
n. Laying a wall
o. Fastening plates
p. Waterproofing concrete block walls
q. Making flagstone, stepping stones, flower boxes, pots, shoe scrapers, concrete pits, sidewalks, driveways, pavements, and floors
r. Base preparation
s. One-course construction
t. Sectional placing
u. Finishing concrete
v. Curing
w. Steps followed in the construction of concrete
    (1) Sidewalks
    (2) Driveways
    (3) Feeding floors
    (4) Concrete foundation
    (5) Retaining walls
    (6) Footings
x. Use of forms
    (1) Earth
    (2) Wooden
y. Concrete placement

Area: Fence Construction

1. Fence type
2. Woven wire
3. Barbed wire
   a. Post type
   b. Wood
   c. Metal
   d. Concrete
4. Post treatment-preservative
5. Fence construction
6. Installing wire
7. Maintaining farm fences

SPECIAL AREAS OF AGRICULTURE

INSTRUCTION

AGRICULTURAL CHEMICALS

Insect and Disease Control

(Sample)

1. Identification
   a. Insects
   b. Diseases
   c. Fungus
   d. Bacteria
2. Chemicals—Liquid and dust
   a. Insecticides
   b. Fungicides
3. Chemical usage and safety precautions
   a. Weed identification
   b. Herbicides
   c. Herbicide usage

Hormones and Sticker Category

1. Purposes
2. Hormones and stickers
3. Usage

Fertilizers

1. Soluble fertilizers
2. Granular fertilizers
3. Fertilizer recommendation
4. Fertilizer manufacturing
5. Lime

Animal Agricultural Chemicals

1. Vaccines
2. Antibiotics
3. Disinfectants
4. Mineral supplements

ORNAMENTAL HORTICULTURE

Trade Analysis

1. Soils
    a. Origin of soils
    b. Classification of soils
    c. Composition of soils
    d. Uses of soils
    e. Construction and care of compost pile
2. Conservation of soil and water
    a. Definition of soil erosion
    b. Classifying land capability
    c. Preventing and controlling gullies
    d. Terracing
    e. Cover crops
    f. Soil-depleting, soil-conserving, and soil-building crops
    g. Conservation irrigation
    h. Mechanics of drainage
    i. Conservation nurseries
3. Insects and diseases
    a. Pests belonging to the animal kingdom
        (1) Stem and leaf eaters
        (2) Root feeders
        (3) Stem borers
        (4) Feeders on fleshy fruits, seed, and storage structures
    b. Pests belonging to the plant kingdom
        (1) Fungi
        (2) Bacteria
        (3) Viruses
    c. Methods of control
        (1) Normal
        (2) Biological
        (3) Artificial
4. Lawns
    a. Establishment of lawns
        (1) Seed
        (2) Sod
        (3) Vegetatively
    b. Renovation of lawns

c. Maintenance of lawns
   (1) Fertilization and liming
   (2) Debris removal
   (3) Soil aeration and rolling
   (4) Irrigation
   (5) Weed control
   (6) Control of insects, diseases, and other pests

5. Woody plant materials
   Deciduous and evergreen trees, shrubs, vines, and ground cover
   a. Structure and function
   b. Identification—summer and winter
   c. Classification
   d. Planting
   e. Transplanting
   f. Study of characteristics
   g. Landscape value

6. Herbaceous plant materials
   Annuals, biennials, perennials, bedding plants, bulbs, corms, tubers, and rootstocks
   a. Structure and functions
   b. Identification
   c. Classification
   d. Planting
   e. Transplanting
   f. Potted plants
   g. Cut flowers
   h. Study of characteristics
   i. Landscape value

7. Plant propagation
   a. Sexual
      (1) Development of fruits and seeds
      (2) Principles of seed selection
      (3) Techniques of seed production and handling
      (4) Principles of seed propagation
      (5) Techniques of seed propagation
   b. Asexual propagation
      (1) Techniques of propagation by cuttings
      (2) Techniques of grafting
      (3) Techniques of budding

(4) Layerage
(5) Propagation by specialized stems and roots

8. Landscape surveying
   a. Operation of leveling instrument
   b. Operation of transit
   c. Field notes and sketches
   d. Drawings
   e. Small property survey
9. Landscape planning
   a. Small and medium property developments
      (1) Public area
      (2) Service area
      (3) Private area
   b. Types of plans
      (1) Plot plans
      (2) Landscape design plans
      (3) Construction plans
      (4) Planting plans
   c. Plant material lists
   d. Garden types
      (1) Formal
      (2) Informal
      (3) Wild
      (4) Water
      (5) Special types
10. Landscape construction
   a. Rough and finish grading
   b. Construction of planting beds
   c. Terraces
   d. Paths and walks
   e. Steps and ramps
   f. Walls
   g. Pools
   h. Driveways and entrances
11. Landscape maintenance
   a. Garden cleanup—spring and fall
   b. Care of lawns
   c. Care of plantings—woody and herbaceous materials

- d. Shrub pruning
- e. Winter protection
- f. Care of tools and equipment

12. Tree repair
    - a. Bracing
    - b. Guying and staking
    - c. Tree surgery
        - (1) Reasons for surgery
        - (2) Essential equipment
        - (3) Surgery procedure
13. Park forestry
    - a. Shade-tree pruning
    - b. Evergreen pruning
    - c. Fruit-tree pruning
    - d. Tree removal
    - e. Stump removal
    - f. Transplanting trees
    - g. Tree moving machinery
14. Job management
    - a. Office routine
        - (1) Business records
        - (2) Insurance
        - (3) Advertising
        - (4) Office library
    - b. Business law
    - c. Cost finding
    - d. Estimation of jobs
    - e. Purchasing
    - f. Job records and accounts
    - g. Labor laws and ordinances
    - h. Social Security laws
    - i. Income taxes and sales taxes
    - j. Job analysis
    - k. Trade papers
15. Greenhouse structures
    - a. Types of greenhouses
    - b. Layout
        - (1) Head house

(2) Greenhouses
(3) Pot shed
(4) Nursery beds
(5) Storage rooms

c. Hotbeds and cold frames
d. Care and repair of equipment and tools

16. Christmas work
    a. Corsages
    b. Wreaths
    c. Centerpieces and mantlepieces
    d. Sprays
17. Plant growing
    a. Potting
    b. Planting
    c. Forcing
    d. Retarding
    e. Pinching
    f. Shading
    g. Staking and typing
    h. Ventilating
    i. Watering
    j. Feeding
    k. Mediums

LESSON ORGANIZATION

A well-taught lesson usually is the result of adequate teacher planning and forethought. A teacher cannot teach that which he does not know.

One method of organization is for the teacher to select the units of instruction and develop them into the following areas: objectives, knowledge and skills to be taught, activities, problems, questions to be completed by the student, and outcomes. References to be used by the student may be listed by the teacher on the job sheet. This class preparation results in the teacher mastering the subject matter before he enters the classroom. It results in deeper involvement of the student with the subject and develops in him a clear vision of the area being studied. The student is aware of the problem being solved and the need for understanding and the circumstances for which the knowledge may be used. Participating experiences should follow class instruction under supervision of the teacher.

A well-organized lesson plan gives direction and confidence to a teacher and provides a means for him to complete his responsibility as a teacher. Discipline problems subside, since the teacher is prepared to organize his class into a workable pattern. Teachers of Vocational-Agriculture should plan the daily program, teach the units effectively, and evaluate the procedures.

Teachers use many methods to instill knowledge into the students' minds. We must be sure our method is doing the job.

THE PROBLEM-SOLVING APPROACH TO TEACHING*

Example: PLAN NO. I.

I. Enterprise or activity: **Soils and Fertilizers**

II. Problem Area: Making and Using Soil Tests

III. Situation

- A. The class has had no previous instruction in this area.
- B. About 10 per cent of the farmers are making use of the local soil-testing bureau.
- C. Soils are deficient in all major elements—nitrogen, phosphorus, and potash; lime is also needed.
- D. All of the boys have some crop as a part of their supervised farming programs.
- E. Two of the home farms represented in the class have limited soil-testing programs in operation.
- F.
- G.

IV. Teacher objectives: To develop the ability of the boys to make soil tests and to use the results of soil tests in connection with their supervised farming programs. Specifically, to develop these abilities:

- A. To determine what soil tests should be made.
- B. To determine what use should be made of the local soil-testing bureau.

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* Reference: Krebs, Alfred H. *For More Effective Teaching*. Danville, Illinois: The Interstate Printers and Publishers, Inc., 1954. Used with permission of the publisher.

C. To make soil tests for pH, phosphorus, and potash.
D. To take soil samples.
E. To interpret soil test results.
F. To make a map showing the soil test results for the fields tested on their home farms.
G. To determine the fertilizer needs of the fields tested, as indicated by the test results and previous history of crops and fertilization on the fields.
H.
I.

V. Teaching procedures

A. Interest approach—discussion questions:
1. Joe, remember that field of clover we looked at on your farm? What was wrong? What did we decide could be done? (The questions refer to a previous discussion in which soil testing was considered.)
2. Do your fathers use soil tests? Who makes the tests?
3. Have any of you made soil tests? How did you make the tests?
4. Do any of your neighbors use soil tests?
5. Why have these soil tests been made? What use has been made of the results? Has this resulted in increased yields?
6. How could you make use of soil tests in connection with your supervised farming program?
7.

B. Anticipated group objectives
(A leading question will be needed to draw these from the pupils. Example: Why are we concerned with learning something about soil testing? What do we want to accomplish through testing our soil?)
1. To find out what fertilizer the soil needs
2. To keep from running down our soil
3. To get higher yields per acre—corn, beans, etc.
4.

C. Anticipated problems and concerns of pupils
(Leading questions will be needed to draw these from the pupils. Example: What things do we need to know and be able to do in order to test our soil and get these higher yields that we were talking about? Further questioning of a specific nature will be required to draw out some of the problems. This is done by the teacher as the discussion moves along.)

1. What tests to make
2. How to make the tests
3. What to make the tests with
4. How to get the soil samples
5. How to tell what the tests mean
6. How to make maps showing the test results
7. How often to test

D. Steps in solving the problems

1. Have the pupils select a problem from the list.
2. Lead the pupils in a discussion of the problem to find out what they know and do not know.
3. Conduct supervised study on those things the pupils do not know.
4. Lead pupils in the final discussion and drawing of conclusions.
5. Have pupils select another problem from the list and repeat the above steps.

E. References and teaching aids

1.
2.

(List those which are to be used in connection with this problem area.)

3.

F. Special activities and events

1. Demonstrate soil tests for pH, phosphorus, and potash
2. Field trip to demonstrate taking soil samples
3. Field trip to local soil testing bureau
4.
5.

G. Evaluation and application
   1. Test (Make up test for this problem area.)
   2. Develop list of approved pr ctices.
      a.
      b.
      c.
   3. Have pupils write up plans for using the soil test results.
   4. Plan for follow-up instruction on home farm visits.

SUMMER WORK PROGRAM

In order to make agriculture a truly vocational program, providing doing and learning experiences for the students, a well-organized summer educational program should be established. The work must be adjusted to meet the desired training experience of the student and advance him in further understanding his chosen profession.

Consideration should be given by the teacher in sponsoring and participating in the following summer program activities:

1. Agricultural program supervision of all-day, young, and adult farmers
   a. Production projects
   b. Agri-business placement
   c. On-farm placement
   d. Improvement projects
   e. Demonstration plots
   f. School-farm placement
   g. Agricultural work study
   h. Program
   i. Project initiation
2. School-farm and group project supervision
   a. Group projects
   b. Experimental plots
   c. Greenhouse operation
   d. School farm operation
   e. Managerial activities
   f. Keeping and analyzing records

3. Departmental work classroom and shop arrangement, milk and soil testing, records and reports course of study
   a. Advisory committee
   b. Project tours
   c. Conference and appointments
   d. Meeting with students and adult farmers
4. Future Farmers of America activity
   a. Summer FFA meeting
   b. State FFA conference
   c. Regional FFA leadership training
   d. Preparation of winning FFA team
   e. Chapter program of work development
5. Professional improvement days
   a. Attending demonstrations and field days
   b. State Vocational Agriculture Conference
   c. Weeks in summer school
   d. Attendance at out-of-State meetings
6. Community service and school community, county and state fairs
   a. Organizing FFA shows
   b. Adult program

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