

DEPARTMENT OF THE INTERIOR

BUREAU OF EDUCATION, WASHINGTON

A COURSE IN VEGETABLE GARDENING FOR TEACHERS.

To become a successful grower of vegetables and an efficient teacher of gardening, pupils need to give an entire year, or its equivalent, to the work. They should become familiar with such problems as soil management, moisture conservation, plant food requirements, vegetable rotation, seed selection, vegetable diseases, and insect enemies, with their control, as well as the canning and marketing of vegetables.

OUTLINE FOR FIELD WORK.

Experience has shown that in a course in gardening the field work and the classroom work are of about equal importance.

A school garden—better if it were large enough to be called a school farm—should be an outdoor laboratory where the fundamental principles and practices of gardening are taught. The knowledge gained through work in the school garden should be directly applied in the raising of vegetables, either in the back yard at home or in a near-by vacant lot. Records of expenditures and receipts may be a part of the field work.

The pupils should become familiar with the following garden occupations:

Hotbeds and cold frames: Making, planting, managing.

Soil preparation: Spading, raking, leveling.

Planting: Marking rows, planting seeds, transplanting plants.

Care of growing crop: Hoeing, with wheel hoe as well as with the ordinary hoe; spraying.

Marketing: Grading of vegetables, preparation of vegetables for the market, selling vegetables, canning.

Equipment: Each pupil will need a spading fork, a garden rake, a hoe, and a planting line. One wheel hoe and one sprayer will do for the entire class.

Whenever it is possible the students should visit good truck farms; observe farm operations, such as plowing, harrowing, rolling, planting by machine, cultivating, spraying, harvesting, and marketing; and secure the farmer's method of bookkeeping.

OUTLINE FOR CLASSROOM WORK.

The purpose of this course is to answer the frequently-asked question, "How can we make our gardens more productive?" To answer this question, one must become familiar with the four divisions of garden problems—knowledge of the function and requirements of

growth of the parts of a plant, management of the soil, selection of the seed, and selection of crops.

Because it is sometimes confusing to select just the problems that confront the practical gardener, the following gardening projects are suggested. The main project is placed first. Its answer depends upon the smaller projects which follow. For instance, to prepare the soil for the best root growth, it is necessary first to know how roots grow in the soil.

So far as possible, recourse should be had to the plant or the soil for the answer. A textbook should be used only as an encyclopedia and as a guide for classroom experiments.

FOUR DIVISIONS OF GARDEN PROBLEMS.

- A. Knowledge of the function and requirements of growth of the parts of a plant.
- B. Management of the soil.
- C. Selection of seeds.
- D. Selection of crops.

A. *Knowledge of the function and requirements of growth of the parts of a plant.*

Project I. What are the soil requirements for good root growth?

1. How do roots grow in the soil? (Nearness to surface, depth, how far do they spread out; where do we find the most roots, why; what part of the root takes in the food, how?)
2. What lessons can be learned from this knowledge?

Project II. Under what conditions are the leaves able to do their best work?

1. What is the work of the leaf?
2. How can the leaves be provided with enough sunlight? With enough moisture?
3. How can the leaves be protected from insect enemies? From plant diseases?
4. How do insects harm the leaves?
5. How do plant diseases harm the leaves?
6. What is the best spray to use for each?
7. When and how often should the leaves be sprayed?

Project III. Under what conditions are the flowers able to do their best work?

1. What is the work of the flower?
2. What devices are used by the flower to insure cross-pollination?
3. How is pollen carried?
4. How have men made use of the knowledge of the flower?

Project IV. Under what conditions are seeds able to develop?

1. What do seeds contain?
2. How can you tell whether the seeds will produce strong plants?
3. How do you plant seeds?
4. What do seeds need to germinate?

B. *Management of the soil.*

Project I. How can a clay soil be made mellow?

1. Of what is a clay soil made?
2. How can the particles of a clay soil be made larger?
 - a. By deep, thorough tillage. (What tools would you use? What results would you expect to obtain by each?)
 - b. Add humus.
 - c. Add lime.

Project II. What can be done so that the soil will contain the right amount of moisture for root growth?

1. What are the sources of water for the roots?
2. How is water lost?
3. How can the loss of water from a clay soil be prevented? From a sandy soil?
4. How is it possible to check the loss of water by evaporation?
 - a. How does soil water reach the surface?
 - b. What is the time, depth, and frequency of cultivation?
5. Why do plants need water?

Project III. How can a soil be made warm for spring crops?

1. What are the sources of heat?
2. How is heat lost?

Project IV. When do soils lack air?

1. Where in the soil is the air?
2. What may take the place of the air in the soil?
3. How may we remove the surplus water?
 - a. In what different ways are soils drained?
 - b. Which is the best method, and why?

Project V. What are the plant foods?

1. Of what is the plant made?
2. What does the plant need to make these things?
3. Where does the plant get these foods?
4. Which of these foods need to be supplied? When and how?

Project VI. What is to be gained by an application of lime?

1. How is it possible to know that a soil needs lime?
2. What forms of lime would you use?
3. When and how would you apply it?

Project VII. Why is humus one of the chief factors in making a soil more productive?

1. How does humus make a soil more mellow?
2. How does humus make a soil hold more moisture?
3. How does humus make a soil warmer?
4. How can humus make the plant food in the soil more available?
5. What plant food is supplied by humus?
6. How would you supply humus?
7. What is the best way, and why?

C. Selection of seeds.

Project I. What are the underlying principles in selecting vegetable seeds?

1. What should be considered in the home production of seeds?
 - a. How would you manage a garden seed plat?
 1. Where would you put it?
 2. How would you prepare the soil?
 3. What care would you give the growing plants?
 4. How would the knowledge of the flower help you?
 5. When would you gather the seeds?
 6. What care would you give them during the winter months?
 7. Would it be necessary to test these seeds?
2. What should be considered in the purchase of seeds?

D. Selection of crops.

Project I. What should be considered in the choice of crops?

1. How much room will each crop require?
 - a. How many rows are needed?
What should the crop yield?
 - b. How far apart are the rows?

2. What will the seeds cost?
 - a. How many seeds per 100 feet of drill?
 - b. How long are the rows to be?
 - c. How many rows needed?
 - d. How many plantings can be made?
3. What soil does the vegetable prefer?
4. Upon what plant food does it draw most heavily?
 - a. Does it contribute to succeeding crops?
5. When will it mature?
6. How is it marketed?
 - a. Is there a local market for either the fresh or canned vegetable?
 - b. Can it be shipped to advantage?
 - c. How is it prepared for market?
 - d. What price should it bring?
 - e. How may it be kept for winter use?

Project II. What should be considered in the choice of varieties?

1. For each season.
2. For home.

Cooking qualities.

- a. Size: Example—What size of a potato do you wish for table use? What size of an ear of corn is most convenient for boiling?
- b. Ease with which it can be prepared: For instance—What shape turnip is easiest to pare?
- c. Taste, flavor, food value. Is sugar chiefly in the white or red rings of a beet? Will the core or the cortex region of carrots contain the more food?
- d. Length of time required to cook?
3. For market.
 - a. Color and other qualities which the consumer wishes.
 - b. Shipping qualities.

Project III. What should be considered in crop requirements?

1. How much labor is required—
 - a. For planting?
 - b. For thinning?
 - c. For weeding?
 - d. For hoeing?
 - e. For staking, training, or blanching?
 - f. For spraying?
2. Is the plant shade or sun loving in its habits?
3. Can it be used as a companion crop?
4. Is the crop started in the open? If not, how are the plants secured?

Equipment for classroom work on the basis of four pupils: Four dinner plates; 4 saucers; 4 eight-ounce, wide-mouth, bottles; 4 glass tumblers; 2 soil racks, each containing 4 student lamp chimneys; 4 pieces of glass, size to cover plates; 1 good thermometer.

Equipment for the entire class: Four 8-inch battery jars; $\frac{1}{2}$ bushel of pure sand; $\frac{1}{2}$ bushel of pure clay; $\frac{1}{2}$ bushel of pure humus; $\frac{1}{2}$ bushel of good loam.

Reference books: "First Book in Farming," by Charles Goodrich; "Soils and Crops," by Hunt & Burkett; "Practical Farming," by Davis; "Principles of Vegetable Gardening," by Bailey; "Injurious Insects," by W. C. O'Kane; "Forcing Book," by Bailey; "Chemistry of Plant and Animal Life," by Snyder; "Bush Fruits," by F. W. Card; "The Pruning Book," by Bailey; "Vegetable Gardening," by Watts; "Productive Vegetable Growing," by Lloyd; Farmers' Bulletins; State Experiment Station Bulletins.