

UNITED STATES SCHOOL GARDEN ARMY  
DEPARTMENT OF THE INTERIOR

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BUREAU OF EDUCATION

WASHINGTON

COURSES IN SCHOOL-SUPERVISED  
GARDENING *for the* NORTHEASTERN STATES

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*A garden for every child—every child in a garden.*



# COURSES IN SCHOOL SUPERVISED GARDENING FOR THE NORTHEASTERN STATES

## I. A COURSE IN GARDENING BASED ON NATURE STUDY FOR THE FIRST SIX GRADES OF THE ELEMENTARY SCHOOLS

### INTRODUCTION.

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The following pages embody some suggestive outlines of courses in gardening based on the Manual for School Supervised Gardening for the Northeastern States. This manual consists of two parts—Part I, Vegetables; Part II, Flowers—and is available for the use of teachers.

Outlines are given herewith for the following courses:

- I. A course in gardening based on nature study for the first six grades of the elementary schools.
- II. A course in gardening for the fifth and sixth grades of the elementary schools.
- III. A 20 weeks' course in gardening for grades V, VI, or VII.
- IV. A summer course in gardening.
- V. A course in school-supervised gardening for normal schools.

In the outlines for the earlier grades of Course I, many suggestions have been derived from A Course in Nature Study for the First Six Grades of Elementary Schools prepared in its final form by a committee of which the present writer was chairman, and published by the Massachusetts State Board of Education.

C. M. W.

## INTRODUCTION

The following pages embody a course in gardening, based on the Manual for School Supervisors, published by the New York State Department of Education. This manual contains of two parts—Part I, Vegetables; Part II, Flowers—and is available for the use of teachers. Outlines are given herewith for the following courses:

- I. A course in gardening based on nature study for the first six grades of the elementary schools.
  - II. A course in gardening for the fifth and sixth grades of the elementary schools.
  - III. A 30-week course in gardening for grades V, VI, or VII.
  - IV. A summer course in gardening.
  - V. A course in school-ground gardening for normal subjects.
- In the outline for the entire course of Grades I, second suggestions have been inserted from a course in Nature Study for the first six grades of the elementary schools, prepared by the Massachusetts State Board of Education, and published by the Massachusetts State Board of Education.

C. M. H.



# COURSES IN SCHOOL SUPERVISED GARDENING FOR THE NORTHEASTERN STATES.

## I. A COURSE IN GARDENING BASED ON NATURE STUDY FOR THE FIRST SIX GRADES OF THE ELEMENTARY SCHOOLS.

### FIRST GRADE.

#### AUTUMN.

##### FLOWERS FOR AUTUMN STUDY.

The only study which young pupils should be expected to make of flowers in this grade is that of acquaintance making through sense perceptions. The real flowers should always be used so that the children may see their color and form, feel the texture of their surfaces, and smell their fragrance. In every case the flowers in the child's environment should be used, including both those wild and those cultivated in gardens. It is probably desirable to lead the pupils to notice which grow wild and which grow in gardens. The following list includes the common kinds that have sufficiently distinctive characteristics for the younger children to learn them easily:

Purple asters.  
Butter and eggs.  
Goldenrod.  
Tansy.  
Mullein.  
Marigold.

Cosmos.  
Sweet pea.  
Sunflower.  
Golden glow.  
Pansy.

##### TREES FOR AUTUMN STUDY.

With the trees as with the wild flowers children must make acquaintance almost wholly through their sense perceptions. They enjoy picking up the fallen leaves and using them in their games as well as in assorting, pressing, and mounting them. Experience has shown that the leaves of the following trees are readily learned by pupils in the first grade. Of course, only such of these should be utilized as are found growing locally.

Tulip tree.  
Sugar maple.  
Red maple.  
White poplar.  
White oak.  
Red oak.  
Bear oak.

Willow.  
Apple.  
Pear.  
Lilac.  
Grey birch.  
Horse chestnut.  
Balm of Gilead.



## GARDENING FOR AUTUMN.

It is important to give young pupils an opportunity for actually growing plants themselves. The most desirable kinds for use at this season are such spring flowering bulbs as the paper-white narcissus, French Roman hyacinth, single Von Sion daffodil, or the single jonquil. Directions for buying and growing these will be found in lessons 133 and 135 of the Flower Manual.

If it is not practicable to have each child grow a bulb individually, let the pupils plant them as a group and watch them during their growth.

## WINTER.

## TREES FOR WINTER STUDY.

Take up a few of the commonest evergreens for sense perceptions by pupils. This work may well be begun about the first of December and culminate with the Christmas holidays. Have the pupils see, feel, smell, and assort the needles of these evergreens: White pine, pitch pine, Norway or other spruce. They should also be shown the cones both closed and open and, if possible, the trees as they grow out of doors. The leaves learned in autumn should be reviewed at least once a month during the winter.

## BIRDS FOR WINTER STUDY.

Pupils in this grade can learn by sight a few common birds if they have an opportunity to see them locally. Domestic pigeons and English sparrows are pretty certain to occur where every child can see them, and the crow and blue jay are also generally easy to observe. Do not confuse the children by putting up around the room a miscellaneous lot of bird pictures of species from all over the world. It will be better at this time to use only the pictures of these four kinds.

## WINTER GARDEN STUDIES.

The bulbs planted in autumn will mostly blossom in winter, and their care should be an important phase of the nature work during these months. The flowers should be used for sense games and in connection with oral stories to a very great extent.

A definite beginning should also be made in this grade in the study of the common vegetables, utilizing for recognizing and sense perceptions these three crops: Turnip, beet, and potato. Have real specimens and supplement these by colored pictures from the seed catalogues.

## SPRING.

## FLOWERS FOR SPRING STUDY.

It is very easy to lead first-grade children to a real knowledge of the spring flowers, both wild and cultivated. They should be given opportunities to see, smell, and handle as many of the following kinds as possible. Lead them to notice which are wild and which grow in gardens.

Bluets.  
Blue violet.  
Buttercups.  
Daisy.  
Tulip.  
Daffodil.

Arbutus.  
White violet.  
Dandelion.  
Pansy.  
Crocus.  
Hyacinth.



## TREES FOR SPRING STUDY.

Even before the trees out of doors have begun to push out their buds the interest of the children may be aroused by bringing inside some branches of poplar, willow, horse-chestnut, or lilac to keep in water until the leaf buds or catkin buds are sent out.

Let them see again the leaves they learned in autumn and then watch the developing branches of the same kinds as they come along in spring. Have specimens of these on the nature table and be sure to change them at least once a week.

## BIRDS FOR SPRING STUDY.

The returning birds are watched with eager interest by first-grade children. Have pictures of those on the following list but not of any others; use every opportunity for the children to see as many of these birds as possible out of doors and help to interest them in learning where they live and what they eat.

Robin.  
Bluebird.  
Song sparrow.  
English sparrow.  
Catbird.

Blue jay.  
Pigeon.  
Purple grackle.  
Swallow.  
Meadow lark.

## GARDENING FOR SPRING.

It is well worth while to give the pupils a real experience in planting the seeds of a few common vegetables in window boxes or paper pots in order that they may watch the germination of the seeds and the growth of the young plants. It is not at all necessary for this purpose that the plants should be carried to maturity. The kinds recommended for this grade are the seeds of bean, pea, corn, and squash. It is also practicable to plant in paper flower pots the seeds of dwarf nasturtium and dwarf marigold, as these will grow well under school-room conditions and later may be transplanted out of doors in the school or home gardens. Early in May it is desirable to plant in a small garden out of doors the seeds of dwarf marigold and cosmos for the pupils to take home a few weeks later to plant in their home gardens.

## SECOND GRADE.

## AUTUMN.

## FLOWERS FOR AUTUMN STUDY.

The children in the second grade can study flowers profitably only by means of their sense perceptions. They of course are able to master somewhat longer words and to differentiate less distinctive flowers than those in the first grade. It is very desirable to review the first-grade work and to lead them to an acquaintance of such of the following kinds as are found in the region of the school:

Arrowhead.  
Closed gentian  
Heal-all.  
Mignonette  
Nasturtium  
Jewelweed.  
Tiger lily.

Wild carrot.  
Fringed gentian.  
Morning-glory.  
Candytuft.  
Poppy.  
Petunia.



## TREES FOR AUTUMN STUDY.

It is essential to review the leaves studied in the first grade by letting the pupils see and handle them and it is desirable to add as many of the kinds listed below as are locally abundant. The children of this grade enjoy playing various guessing and recognition games with the leaves and are easily able to make attractive booklets of the mounted leaves:

Elm.	Alder.
White maple.	Locust
Red birch.	Catalpa.
Sassafras	Ash.
Butternut	Buttonwood or sycamore.
Aspen poplar.	Large-toothed poplar.
Lombardy poplar.	

It is important in this grade to give the pupils as many opportunities as possible of noticing the distinctive features of the various trees whose leaves they have been studying.

## GARDENING FOR AUTUMN.

The pupils in this grade also should be given an opportunity to plant and care for a few spring flowering bulbs and if practicable one or two foliage plants. Of the former the French Roman hyacinth, campernelle jonquil, and paper white narcissus are desirable; and of the latter the asparagus fern and inch plant are excellent. Suggestions for growing all of these will be found in lessons 128, 139, and 144 in the Flower Manual.

## WINTER.

## TREES FOR WINTER STUDY.

The three or four species of evergreens taken up in the first grade should be briefly reviewed with real specimens of the twigs, needles, and cones, and these additional species so far as they grow locally be taken up:

Arbor vitae.	Hemlock.
Fir balsam.	Larch or tamarack.

The leaves of deciduous trees learned in autumn should be reviewed by means of guessing or recognition games at least once a month throughout the winter.

## BIRDS FOR WINTER STUDY.

Take advantage of every opportunity for observing winter birds of almost any kind. The four species listed for the first grade should be noticed again and if possible the following should be added:

Chickadee.	Woodpecker.
Nut hatch.	Snow bunting.

Provide pictures of each of these species, but do not make a miscellaneous picture gallery.

Fix up a place near the windows of the room if possible for attracting birds to food, by placing there bones, suet, or grains.

## WINTER GARDEN STUDIES.

Here as in the first grade much of the garden interest should come from the individual care of the bulbs planted by the pupils. These bulbs will come into blossom during the weeks of winter and may be either taken home by the pupils or left in the schoolroom. In the latter case it is desirable to let the plants ripen off after the flowers fade in order to give the pupils a better idea of the yearly growth-cycle of these bulbs. The children will of course continue to take care of the asparagus ferns and inch plants in their winter gardens.



After the bulbs are out of the way let each pupil plant one or more seeds of the scarlet runner bean.

The following garden crops should be studied in this grade for recognition and sense perceptions: Pea, onion, pumpkin, and potato. Have real seeds, bulbs, or tubers, as well as colored pictures from seed catalogues.

### SPRING.

#### FLOWERS FOR SPRING STUDY.

Pupils in this grade should make a decided advance during this term in their knowledge of wild and cultivated flowers. An incidental review should be made of the flowers on the first grade list and the pupils should see, feel, and smell as many of the following as can be obtained in the locality;

Bloodroot.	Wild geranium.
Jack-in-the-pulpit.	Cowslip or marsh marigold.
Anemone.	Red clover.
White violet.	White clover.
Strawberry.	Candytuft.
Columbine.	California poppy.
Blue flag.	Morning-glory.
Trillium.	

#### TREES FOR SPRING STUDY.

Early in the term review the leaves of the trees studied in autumn, then let the pupils watch the opening buds and blossoms of these same kinds as they develop in spring.

#### BIRDS FOR SPRING STUDY.

Keep a bird calendar on the blackboard, listing especially the kinds on the first grade list and adding as many of the following as are seen:

Junco.	Woodpecker.
Baltimore oriole.	Gold finch.
Red-winged blackbird.	Meadow lark.

#### INSECTS FOR SPRING STUDY.

Pupils of this grade should become familiar with a few common insects, watching them at work upon flowers or in other places and learning as much as possible of their life histories. Teach them the changes undergone by a butterfly by means of oral stories and watching at least one caterpillar kept in a glass covered box or other vivarium. The following list is suggested:

Honeybee.	Monarch butterfly.
Bumblebee.	Tent caterpillars.
White cabbage butterfly.	Red and black caterpillars.
Sulphur yellow butterfly.	House fly.
Yellow swallowtail butterfly.	

#### GARDENING FOR SPRING.

The pupils should grow in their window garden spaces or in window boxes the vegetables studied in winter in order to learn how they are reproduced. Peas and pumpkins may be started from seeds; onions from seeds and sets; and potatoes from tubers.

Early in May start the seeds of some common garden flowers in an outdoor seed bed in order that the children may take the seedlings home later for their own garden. Good plants for this purpose are dwarf marigold, cosmos, calendula, and China asters.



## THIRD GRADE.

## AUTUMN.

In the third grade sense training with natural objects should of course be continued, but children of this age are also eager to learn facts in regard to the things around them. Consequently it is desirable to include lessons upon structure and uses as well as the mere acquaintance-making. Such items as the structure of flowers, leaves and branches, and the relations of flowers to insects, or of leaves to light may well be brought in to the work, adding interest and giving glimpses of the great world of knowledge into which the child is being introduced.

## FLOWERS FOR AUTUMN STUDY.

A rapid review by means of actual flowers should be made of the kinds listed for the first two grades. In addition the following should be taken up so far as examples are available for the children to use their senses upon—

Chicory.  
Yarrow.  
Joe Pye weed.  
Fall dandelion.  
Dahlia.  
China aster.  
Sweet alyssum.  
California poppy.

Zinnia.  
Boneset.  
Ironweed.  
Ladies' tresses.  
Loosestrife.  
Verbena.  
Gladiolus.  
Stocks.

## TREES FOR AUTUMN STUDY.

If proper methods for the study of leaves have been utilized during the first two grades it is easily possible to have the children acquainted with the trees common in the locality by the end of the third grade. Each teacher will of course adopt the methods that seem best to her, but she will find nothing that will be more helpful in fixing in mind the leaves of the trees found locally than to have the pupils make booklets of pressed and mounted leaves. In addition to those of the previous lists at least 10 of the following species should be added:

Chestnut.  
Canoe birch.  
Hawthorn or thorn apple.  
Norway maple.  
Shad bush.  
Cottonwood.  
Pussy willow.

White willow.  
Box elder or ash-leaved maple.  
Linden or basswood.  
Hickory.  
Witch hazel.  
Honey locust.  
Swamp white oak.

## BIRDS FOR AUTUMN STUDY.

The most interesting bird study for third-grade pupils at this season in situations where outdoor observations may be made is that of noticing the kinds which are gathering in flocks for the journey southward. Some species go in family groups while others gather in great flocks of many families. It is also interesting to notice the differences between the parents and the young of this season's hatchings. A fall bird calendar will be helpful in enlisting the interest of the pupils. Lead them to notice which birds go first and which stay longest.



## GARDENING FOR AUTUMN.

It should be possible in the third grade to have the pupils grow some bulbs which are a bit more difficult than those listed for the first two grades. It is desirable also to give them the experience with the other varieties in order to widen their range of interest. The following are suggested for this purpose: Grand Primo narcissus, Giant Princeps daffodil, Dutch Roman hyacinth. Two good foliage plants are spearmint and Asparagus sprengeri. Discussions of these will be found in lessons 138, 142, and 144, of the Flower Manual.

## WINTER.

## TREES FOR WINTER STUDY.

By the end of this winter term the pupils should know practically all of the native evergreens found locally. Start with those which they have already learned in the first two grades and take up whatever species that grow locally. Show their values in the winter landscape and their usefulness to the birds and small mammals for shelter from winter storms.

## BIRDS FOR WINTER STUDY.

In January make a blackboard list of the winter birds seen by the pupils and have near by a set of pictures of all the species that are likely to occur in your locality. If possible provide a feeding place near the school where bones, suet, and grains may be placed.

## WINTER GARDEN STUDIES.

The children will of course continue to care for the bulbs or other plants started during the fall term. In addition they should study the following for recognition and sense perceptions: Cabbage, carrot, parsley, sweet potato, squash. Have real specimens and colored pictures showing the different types of structure.

## SPRING.

## FLOWERS FOR SPRING STUDY.

By the end of this term the pupils should be acquainted with most of the common flowers, both wild and cultivated. In addition to those listed in the first two grades the following should be known so far as they occur in the locality of the school:

Hepatica.  
Birds'-foot violet.  
Chickweed.  
Bellwort.  
Cinquefoil.  
Robins plantain.  
Solomon's seal.  
Dogtooth violet.  
Blue-eyed grass.

Snowdrop.  
Easter lily.  
Madonna lily.  
Snapdragon.  
Japanese iris.  
German iris.  
Globeflower.  
Bachelor's buttons.  
False Solomon's seal.

## TREES FOR SPRING STUDY.

Observe the spring condition of all the trees the pupils know. Make lists on the board under these two headings: "The catkin bearers," "The blossom bearers." By the end of the term see that each pupil knows from his own seeing the kinds on each list.



## BIRDS FOR SPRING STUDY.

The children are always eager to note the return of the birds. Have colored pictures of the kinds found locally. Lead the pupils to notice songs and feeding habits. Of course all the birds on the lists for the first and second grades should be noted so far as they are seen and watch should be kept for the following others so far as they occur locally:

Flickers.  
Chimney swift.  
Barn swallow.  
Kingbird.  
Mocking bird.

Phoebe.  
White-breasted nuthatch.  
Humming bird.  
Wren.

## GARDENING FOR SPRING.

Children in the third grade are old enough to have real gardens of decided value. From March onward adapt to the special needs of your pupils as many as possible of the following lessons in the Manual of School Supervised Gardening in the Northeastern States.

Lesson 1.—First catch your rabbit.  
Lesson 3.—Plans for small gardens.  
Lesson 28.—Getting your garden ready.  
Lesson 29.—How to plant your crops.  
Lesson 30.—The crops to plant first.  
Lesson 35.—The care of the garden.  
Lesson 36.—Weeding the garden.  
Lesson 37.—Thinning your young vegetables.  
Lesson 41.—John's dream.  
Lesson 51.—Radishes—the easiest garden crop.  
Lesson 54.—Beets for both summer and winter.

Lesson 55.—Carrots for every garden.  
Lesson 60.—Growing onions from sets.  
Lesson 64.—Five purpose beans.  
Lesson 65.—Sweet corn to eat and to can.  
Lesson 66.—Cucumbers for salads and pickles.  
Lesson 68.—Setting out tomato plants.  
Lesson 72.—The cabbage worms.  
Lesson 86.—The toad—The garden tank.  
Lesson 88.—Witch grass—the root of garden evil.  
Lesson 89.—Quality vegetables from the garden.

## FOURTH GRADE.

The first three grades have largely been devoted to acquaintance-making through sense-perceptions of the living things in the pupil's world. The point of view should now change to that of helping the pupils to get experience in learning how these things are useful to man and to show them their power to make them useful. From now on certainly the motto of the School Garden Army should be applied:

*A garden for every child.  
Every child in a garden.*

The experience of the pupils in these gardens will yield much material for informal socialized discussions and the skillful teacher can readily group these around certain topics to get their greatest educational value. Some of these topics are suggested below.

## AUTUMN.

## FLOWERS FOR AUTUMN STUDY.

Special emphasis should here be laid upon the distinction between wild flowers and garden flowers. By the end of this term the pupils should be acquainted with all the common fall flowers of the locality. One good way to review and summarize what the pupils have learned previously is to make a blackboard list under the two headings suggested.

Have the pupils plant at least three kinds of spring-flowering bulbs. Suggestive lessons on ordering and planting these will be found in lessons 133, 137, and 141, of the Flower Manual.



## INSECTS FOR AUTUMN STUDIES.

Most young gardeners will have seen some insect pests at work. Teach the methods of fighting them, as indicated in these lessons of the manual.

Lesson 73.—Spraying for biting insects.

Lesson 74.—Applying arsenate of lead.

Lesson 76.—The black squash bug.

Lesson 77.—The aphids or plant lice.

Lesson 78.—Kerosene emulsion.

## GARDENING FOR AUTUMN.

Show the pupils the necessity of getting a place to make the garden and of getting it ready this fall, using such lessons as these:

Lesson 1.—First, catch your rabbit.

Lesson 2.—How to plan your garden.

Lesson 3.—Plans for small gardens.

Lesson 10.—The kinds of garden soils.

Lesson 15.—Humus—the food producer.

Lesson 16.—Improving sandy soils.

Lesson 17.—Manures.

Lesson 28.—Getting your garden ready.

Lesson 97.—Kale for September sowing.

Lesson 98.—Planting onion sets this fall.

Lesson 99.—Getting ready for spring.

## WINTER.

## TREES FOR WINTER STUDY.

A good topic for tree study in this grade at this season is that of the growth of trees from seeds and cuttings. Lead the pupils to notice the native trees of the locality and find out how they are reproduced. Of course they will see that most of them grow from seeds of various sorts. They will also find that some reproduce themselves naturally from cuttings. Start cuttings of poplar, willow, and Russian artemisia in bottles of water to see how cuttings grow. Study the structure of these twigs to see where the roots come out. Let the pupils see if there is any relation between the fact that willows grow along the river banks and their reproduction from cuttings.

## BIRDS FOR WINTER STUDY.

Take up the topic of "Winter birds as garden friends." Set the pupils to finding out what the winter birds eat and how they get their food. In this connection study especially the snowbirds and winter sparrows as eaters of weed seeds and the chickadee and winter woodpeckers as eaters of insects. Furnish food to attract birds near the windows and get the pupils to collect an exhibit of winter food of birds, chiefly wild fruits, weed seeds, nuts, and insects.

## WINTER GARDEN STUDIES.

The pupils will of course continue to care for the bulbs started in autumn.

Take up the study of garden soils, with especial reference to the improvement of the soil in the garden of each pupil. Utilize these lessons in the Vegetable Manual:

Lesson 10.—The kinds of garden soils.

Lesson 15.—Humus—the food producer.

Lesson 14.—Feeding the fishworms.

Lesson 11.—The hidden gold.

Lesson 12.—The third plowing.

Lesson 21.—Green manures.

Study these crops for recognition, sense-perceptions, and uses, having real specimens or colored pictures or both:

Salsify.

Parsnip.

Cucumber.

Melons.

Spinach.

Chard.

Corn.

Wheat.

Oats.



## SPRING.

## FLOWERS FOR SPRING STUDY.

Make the same sort of a study of the spring flowers as was made of those of autumn, classifying them under the two headings, "Wild" and "Cultivated." Get the pupils to finding out the origin of cultivated flowers and learning that most of them were once wild in some part of the world.

The following list may be helpful in showing the flowers available for such study in addition to those on the lists for the earlier gardens:

Miterwort.  
Saxifrage.  
Goldthread.  
Spring beauty.  
Yellow violet.  
Bunch berry.  
Partridge berry.  
Indian pipe.  
Meadow rue.  
Pitcher plant.  
White water lily.

Cow lily.  
Fringed polygala.  
Moss pink.  
Wild yellow lily.  
Lady's slipper.  
Scilla.  
Balsam.  
Phlox.  
Globeflower.  
Bachelor's buttons.  
Tuberose.

## THE TREE GARDEN.

If a small plot of land is available in or near the school yard utilize it for a tree garden. On even so small a space as 6 by 10 feet one can grow a surprising number of trees. The soil need not be rich and the situation is all the better if in partial shade. Cuttings may be made early in spring before the buds start of currants, poplars, willows, Russian artemisia, and golden bell (*Forsythia*). Plant these as early as possible.

Sprouted acorns and other nuts are readily found and planted. So also are many young tree seedlings which may readily be found by the roadside and in other places.

## GARDENING FOR SPRING.

Early in March begin planning for a spring garden for each pupil. Encourage them to plan for some of the following crops: Radishes, lettuce, Swiss chard, beets, kohlrabi, sweet corn, and cucumbers. Utilize the following lessons in the Vegetable Manual:

Lesson 2.—How to plan your garden.  
Lesson 3.—Plans for small gardens.  
Lesson 5.—Estimating the needs.  
Lesson 6.—Short season companion crops.  
Lesson 13.—Crops for new clay gardens.  
Lesson 22.—The seed order.  
Lesson 23.—Using the seed catalogues.  
Lesson 24.—Varieties of vegetables.  
Lesson 29.—How to plant your crops.  
Lesson 30.—The crops to plant first.  
Lesson 32.—When to plant your crops.

Lesson 36.—Weeding your garden.  
Lesson 37.—Thinning your young vegetables.  
Lesson 43.—How to study a crop.  
Lesson 44.—Lettuce for home gardens.  
Lesson 55.—Carrots for every garden.  
Lesson 59.—Kohl-rabi for young gardeners.  
Lesson 60.—Growing onions from sets.  
Lesson 64.—Five-purpose beans.  
Lesson 65.—Sweet corn to eat and to can.  
Lesson 66.—Cucumbers for salads and pickles.

Some of the pupils at least should be encouraged to plant such annual flowers as nasturtium, bachelor's buttons, sweet alyssum, and China asters. These lessons in the Flower Manual may be taught in this connection: Lesson 146, 149, and 150.



## FIFTH GRADE.

## AUTUMN.

## STORING GARDEN CROPS.

Soon after school opens many of the young gardeners meet problems in harvesting and storing their vegetables. The following lessons may well be taken up at this time, being sure that the pupils have an opportunity to discuss the ways in which each lesson applies to their own conditions:

Lesson 89.—Quality vegetables from the garden.  
Lesson 90.—Selling your vegetables.  
Lesson 91.—Storing your vegetables.

Lesson 92.—Storing root crops.  
Lesson 93.—Harvesting and storing squashes.  
Lesson 94.—Digging and storing potatoes.

## GARDEN PESTS AND THEIR CONTROL.

The experiences of the summer are likely to promote a real interest in this subject. Study definitely the life history of each of the more important insect pests which have been troublesome. Get in the minds of the pupils the difference between insect injuries and plant diseases, the transformations of insects, and the differences between biting insects and sucking insects. These lessons should be helpful:

Lesson 84.—Plant diseases.  
Lesson 72.—The cabbage worm.  
Lesson 75.—The tomato worms.  
Lesson 76.—The black squash bug.  
Lesson 77.—The aphids or plant lice.

Lesson 78.—Kerosene emulsion.  
Lesson 79.—Spraying with tobacco solutions.  
Lesson 82.—The corn-ear worm.  
Lesson 83.—How to fight potato pests.

## GARDENING FOR AUTUMN.

It is highly important to impress upon the pupils the necessity of clean garden culture in the fall and of the value of tillage and fertilization at this season. The following lessons may be taken up in connection with the reports of the pupils. Fall inspection of the home gardens by the captains or lieutenants of the Garden Army Company will help to keep up the interest:

Lesson 14.—Feeding the fishworms.  
Lesson 15.—Humus, the food producer..  
Lesson 16.—Improving sandy soils.  
Lesson 17.—Manures.

Lesson 21.—Green manures.  
Lesson 98.—Planting onion sets this fall.  
Lesson 99.—Getting ready for spring.

## WINTER.

## GARDEN WEEDS IN WINTER.

This is a good topic to take up in connection with the garden. Lead pupils to notice how weeds pass the winter as seeds or as roots or tubers. How are the seeds distributed in winter: Which by wind, which by water, which by animals? Get a collection of weed seeds and sow some in window boxes. Use "Lesson 36.—Weeding your garden." Start booklets of garden weeds.

## GARDEN CROPS FOR STUDY.

Make a definite study of several of the garden crops the pupils have grown or should grow. Use seed catalogues constantly and follow the outline in lesson 43: How to study a crop.

The following lessons may be used as needed:

Lesson 46.—Parsley.  
Lesson 47.—Spinach.  
Lesson 50.—Endive.  
Lesson 51.—Radishes, the easiest garden crop.

Lesson 52.—Planting turnips early and late.  
Lesson 56.—Parsnips.  
Lesson 57.—Salsify.  
Lesson 58.—Cabbages.



## SPRING.

## GARDENING FOR SPRING.

Every fifth-grade pupil should plan for as good a real garden as possible. Begin with a discussion based on "Lesson 5.—Estimating the needs," and follow with "Lesson 2.—How to plan your garden," and "Lesson 3.—Plans for small gardens," "Lesson 4. Plans for larger gardens." Then take up a study of varieties of vegetables based on "Lesson 24.—The seed order." Then take up as many of the following lessons as seem necessary to meet the needs of the pupils:

Lesson 6.—Short season companion crops.  
Lesson 7.—Long season companion crops.  
Lesson 28.—Getting your garden ready.  
Lesson 29.—How to plant your crops.  
Lesson 30.—The crops to plant first.  
Lesson 31.—The outdoor seed bed.  
Lesson 32.—When to plant your crops.

Lesson 38.—How to thin vegetables.  
Lesson 39.—How to transplant.  
Lesson 40.—Mulches and how to use them.  
Lesson 68.—Setting out tomato plants.  
Lesson 69.—Training tomato plants.  
Lesson 8.—Succession cropping.  
Lesson 9.—Follow crops.

## SIXTH GRADE.

## THE GARDEN EXHIBIT.

Have the officers of the sixth grade companies take charge of a garden exhibit including at least the products of the pupils of this grade, but preferably also of the products of all the pupils of the school in grades below the sixth. Have both flowers and vegetables. Prepare for it by means of these lessons:

Lesson 89.—Quality vegetables from the garden.  
Lesson 94.—Digging and storing potatoes.  
Lesson 95.—Preparing root crops for fairs and exhibitions.

Lesson 96.—Types of marketing.  
Lesson 126.—China asters for exhibition.

## STUDIES IN CROP PRODUCTION.

Begin a definite study of crops grown for the use of man. Base the study upon the garden experiences of the pupils, and utilize seed catalogues, textbooks, and the vegetable and flower manuals as helps in the work. During the fall term take up these topics: Root crops, bulb crops, vine crops, pomaceous fruits, and tuber crops. Have real specimens and colored pictures in connection with each crop. The following lessons will be helpful:

Lesson 48.—New Zealand spinach.  
Lesson 51.—Radishes—the easiest garden crop.  
Lesson 52.—Planting turnips, early and late.  
Lesson 53.—Rutabagas.  
Lesson 55.—Carrots for every garden.  
Lesson 56.—Parsnips.

Lesson 57.—Salsify or vegetable oyster.  
Lesson 59.—Kohlrabi for young gardeners.  
Lesson 60.—Growing onions from sets.  
Lesson 61.—Onions from seed.  
Lesson 62.—Potatoes.  
Lesson 67.—Winter squashes.

## WINTER.

## STUDIES IN CROP PRODUCTION.

Take up other crops grown by man than those studied during the autumn term. These topics are suggested: Salad crops, greens crops, flowers, stone fruits, small fruits, grasses, and clovers. Use seed and fruit-tree catalogues, colored pictures, and the real things as much as possible. These lessons may be helpful:

Lesson 44.—Lettuce for home gardens.  
Lesson 45.—Celery.  
Lesson 46.—Parsley.  
Lesson 50.—Endive.

Lesson 58.—Cabbages.  
Lesson 47.—Spinach.  
Lesson 48.—New Zealand spinach.  
Lesson 49.—Swiss chard for summer use.



## THE FRIENDLY BIRDS.

Take up this topic for a month. Give the pupils a comprehensive idea of the place of birds in nature. Study their foods—insects, fruits, seeds, mice, and other things. Show how the structure of each group of birds fits them to their feeding habits. "Lesson 85.—The chimney swift, the garden ace," may prove useful.

## SPRING.

Start an intensive garden campaign with the objective of having each pupil have as large and as productive a garden as possible. Take up garden plans, with a plan by each pupil, and methods of preparing and fertilizing the soil. Then help in getting the seed orders made out, following with studies of planting the crop. Later take up methods of culture utilizing the lessons under the subheading, "Growing the crop." Study any special crops new to the pupils, and toward the end of the term take up the study of garden pests.

Have the Vegetable Manual and the Flower Manual ready for reference at all times. Let the officers of the Garden Army Company read many of the lessons aloud to the company.

## II. A COURSE IN GARDENING FOR GRADES V AND VI.

It is the commonly accepted opinion that the fifth and sixth grades are two of the best years for the study of gardening in the schools, with practical work on the part of the pupils in real gardens outdoors, and as much indoor practice in growing plants as possible. The following outline of lessons is suggested for these years.

## GRADE V.

## A. GARDEN CROPS: VEGETABLES.

A real study of real crops with socialized recitations in which the pupils are encouraged to relate their garden experiences will be of greatest value. These recitations may be based upon the following lessons in the Vegetable Manual, supplemented by the vegetables themselves and studies of seed catalogs:

Lesson 43.—How to study a crop.  
Lesson 61.—Growing onions from sets.  
Lesson 51.—Radishes—the easiest garden crop.  
Lesson 44.—Lettuce for home gardens.  
Lesson 49.—Swiss chard for summer use.  
Lesson 54.—Beets for both summer and winter.  
Lesson 55.—Carrots for every garden.  
Lesson 46.—Parsley.  
Lesson 47.—Spinach.

Lesson 48.—New Zealand spinach.  
Lesson 66.—Cucumbers for salads and pickles.  
Lesson 58.—Cabbages.  
Lesson 52.—Planting turnips early and late.  
Lesson 65.—Sweet corn to eat and to can.  
Lesson 63.—Kohlrabi for young gardeners.  
Lesson 64.—Five-purpose beans.  
Lesson 68.—Setting out tomato plants.  
Lesson 69.—Training tomato plants.

## B. GARDEN CROPS: FLOWERS.

It is well worth while to give to both boys and girls a broader conception of gardening than they get from studying and growing vegetables alone. Gardens for beauty rank next in value to gardens for food. By taking up the following lessons in the Flower Manual in a vital way the pupils will get much knowledge and experience:

Lesson 127.—Making flower pictures indoors.  
Lesson 132.—Little gardens indoors.  
Lesson 128.—Flowers for Thanksgiving.  
Lesson 133.—Ordering bulbs for forcing.  
Lesson 141.—A pot of crocuses.

Lesson 140.—Planting tulips outdoors.  
Lesson 143.—Hurrying up jack-in-the-pulpit.  
Lesson 145.—The Madeira vine.  
Lesson 144.—Asparagus for indoor beauty.  
Lesson 150.—Sweet alyssum.



## C. GARDEN PRACTICE.

All pupils who have had experience in gardens will appreciate in some degree the necessity of a knowledge of garden practices to insure success. The following lessons in the Vegetable Manual are suggested for this course:

Lesson 23.—Using the seed catalogues.  
Lesson 22.—The seed order.  
Lesson 24.—Varieties of vegetables.  
Lesson 25.—Seed testing in the school.  
Lesson 31.—The outdoor seed bed.  
Lesson 28.—Getting the garden ready.

Lesson 37.—Thinning your young vegetables.  
Lesson 15.—Humus—the food producer.  
Lesson 20.—The compost heap.  
Lesson 16.—Improving sandy soils.  
Lesson 18.—Commercial fertilizers.  
Lesson 14.—Feeding the fishworms.

## GARDEN PESTS.

Pupils in this grade should be thoroughly grounded in a knowledge of the most important facts about insects that affect garden crops. Such a knowledge should include at least a real understanding of the changes undergone by insects from egg to adult and the two great methods by which they get their food, by biting and by sucking. A careful study of these lessons will help to this end:

Lesson 72.—The cabbage worms.  
Lesson 73.—Spraying for biting insects.  
Lesson 77.—The aphids or plant lice.  
Lesson 79.—Spraying with tobacco solutions.  
Lesson 76.—The black squash bug.

Lesson 85.—The chimney swift—the garden ace.  
Lesson 86.—The toad—the garden tank.  
Lesson 87.—The Mole—The tunnel maker.  
Lesson 88.—Witch grass—the root of garden evil.

## SIXTH GRADE.

The garden studies of this grade should of course be based upon the knowledge and experience of the pupils. The officers of the School Garden Army Company may readily be led to an active supervising interest in an exhibit of garden products to which the public should be invited. Such an exhibit is an excellent basis for a comprehensive study of garden crops under this first topic.

## A. MORE GARDEN CROPS: VEGETABLES.

The aim here should be to complete the list of valuable vegetables which the pupils may grow in their gardens, now or later. The following lessons will supplement the studies made in the fifth grade:

Lesson 43.—How to study a crop.  
Lesson 23.—Using the seed catalogues.  
Lesson 45.—Celery.  
Lesson 50.—Endive.  
Lesson 53.—Rutabagas.  
Lesson 56.—Parsnips.  
Lesson 57.—Salsify or vegetable oyster.

Lesson 61.—Onions from seed.  
Lesson 62.—Potatoes.  
Lesson 63.—Peas.  
Lesson 67.—Winter squashes.  
Lesson 70.—Eggplant.  
Lesson 71.—Sweet peppers.

## B. MORE GARDEN CROPS: FLOWERS.

The study of flowers and their uses should be continued throughout the year as opportunity offers. The following lessons in the *Flower Manual* are suggested:

Lesson 126.—China asters for exhibition.  
Lesson 130.—Making flower pictures on the walls.  
Lesson 139.—Growing bulbs in fiber.  
Lesson 135.—Bulbs for Christmas presents.

Lesson 138.—Hyacinths for winter beauty.  
Lesson 152.—Ferns to grow indoors.  
Lesson 148.—Bringing in the spring wild flowers.  
Lesson 154.—The beautiful gladiolus.



## C. ADVANCED GARDEN PRACTICE.

The greater garden experience of pupils in this grade will enable them to discuss more intelligently than before the points brought out in the following lessons:

Lesson 6.—Short-season companion crops.  
Lesson 7.—Long-season companion crops.  
Lesson 35.—Weeding your garden.  
Lesson 33.—Crops for late planting.  
Lesson 34.—Root crops for late sowing.  
Lesson 38.—How to transplant.

Lesson 40.—Mulches and how to use them.  
Lesson 93.—Harvesting and storing squashes.  
Lesson 94.—Digging and storing potatoes.  
Lesson 95.—Preparing root crops for fairs.  
Lesson 102.—Your asparagus bed.  
Lesson 26.—Green manures.

## D. GARDEN PESTS AND THEIR CONTROL.

A further study of this topic is well worth while, reviewing the knowledge the pupils may have of insect transformations and methods of destroying insect pests. Most of the lessons listed below are additions to the fifth-grade list.

Lesson 73.—Spraying for biting insects.  
Lesson 74.—Applying arsenate of lead.  
Lesson 82.—The corn ear worm.  
Lesson 80.—Squash and cucumber beetles.  
Lesson 75.—The tomato worms.

Lesson 78.—Kerosene emulsion.  
Lesson 81.—The cutworms.  
Lesson 83.—How to fight potato pests.  
Lesson 84.—Plant diseases.

These lessons may well be supplemented by discussions of other insects of special local interest. Any pest that is injuring or has lately injured the crops of the pupils should of course be considered. In the case of all insects that have complete life changes—like the butterflies and beetles—these stages should be taken up:

When and where the egg is laid.  
When the larva hatches.  
What the larva feeds upon.  
How long the larva lives.

When and where it change to a chrysalis.  
How long it stays as a chrysalis.  
What the adult insects feed upon.

The following insects are likely to come to the attention of pupils and teachers at various times:

The carrot caterpillar.  
The stalk borer.  
The spinach leaf miner.  
The squash borer.  
Grasshoppers.

The pea weevil.  
The asparagus beetle.  
The blister beetles.  
The army worm.  
The bean weevil.

## E. SCOUTING FOR NEW PESTS.

Several very destructive insects are at work in restricted localities in the Northeastern States which as yet are not generally distributed. Almost any of them may be introduced into a new region at any time. Consequently it is desirable that the young soldiers of the School Garden Army should know of them and be on the alert for their first appearance. The more important of these dangerous invaders are:

1. The gipsy moth.  
2. The brown-tail moth.

3. The corn borer.  
4. The Japanese beetles.

Special bulletins describing these pests may be obtained free on application to the Entomologist, United States Department of Agriculture, Washington, D. C. Let the captains or lieutenants send for these.



### III. A TWENTY-WEEKS' COURSE IN GARDENING FOR GRADES V, VI, OR VII.

A special pamphlet entitled "Forty Lessons in Gardening for the Northeastern States" is available for the use of teachers who desire to take up the subject in February to continue until June. Two lessons a week with periods of about 20 minutes each will cover the course. An attempt has been made to arrange them in a seasonal sequence, so that the lessons will coincide with the real work the pupils may do. Each teacher can, of course, vary the order to meet the conditions with respect to her own pupils.

The numbers and titles of this arrangement of the lessons are as follows:

- |   |  |
|---|--|
| Lesson 1.—First, catch your rabbit.               | Lesson 21.—Thinning your young vegetables.     |
| Lesson 2.—How to plan your garden.                | Lesson 22.—Planting turnips early and late.    |
| Lesson 3.—Using the seed catalogues.              | Lesson 23.—Sweet corn to eat and to can.       |
| Lesson 4.—The seed order.                         | Lesson 24.—Succession cropping.                |
| Lesson 5.—Getting your garden ready.              | Lesson 25.—How to transplant.                  |
| Lesson 6.—Seed testing in the school.             | Lesson 26.—Cucumbers for salads and pickles.   |
| Lesson 7.—When to plant your crops.               | Lesson 27.—Setting out tomato plants.          |
| Lesson 8.—How to plant your crops.                | Lesson 28.—The care of the garden.             |
| Lesson 9.—Radishes for school-supervised gardens. | Lesson 29.—Mulches and how to use them.        |
| Lesson 10.—Growing onions from sets.              | Lesson 30.—The compost heap.                   |
| Lesson 11.—Peas.                                  | Lesson 31.—How to kill the biting insects.     |
| Lesson 12.—Short-season companion crops.          | Lesson 32.—The cabbage worms.                  |
| Lesson 13.—Long-season companion crops.           | Lesson 33.—How to kill the sucking insects.    |
| Lesson 14.—Humus—the food producer.               | Lesson 34.—The aphids or plant lice.           |
| Lesson 15.—Commercial fertilizers.                | Lesson 35.—Quality vegetables from the garden. |
| Lesson 16.—Swiss chard for summer use.            | Lesson 36.—Plant diseases.                     |
| Lesson 17.—Carrots for every garden.              | Lesson 37.—Two friends of the gardener.        |
| Lesson 18.—Beets for both summer and winter.      | Lesson 38.—Selling your vegetables.            |
| Lesson 19.—Spinach.                               | Lesson 39.—Storing your vegetables.            |
| Lesson 20.—Weeding your garden.                   | Lesson 40.—Judging the home gardens.           |

### IV. A SUMMER COURSE IN GARDENING.

It is well worth while to supplement the practical work in the garden during the vacation season with a few definite lessons that take up the particular problems the pupils are meeting in their gardens. Such a course must of necessity vary greatly and can not well be systematized in advance.

The problems met, however, will be likely to come under the general headings in which the garden lessons of the manual are classified. Thus when the time for replanting comes in July, lessons 8 and 9 on "Succession cropping" and "Follow crops" as well as lessons 33 and 34 on "Crops for late planting" may well be taken up and their principles applied to the particular problems of each young gardener. Or if a garden soil is poor in quality, needing both the addition of fertility and the working over given by deep tillage at least four of the lessons under the heading "Soils" may well be taken up as well as some of those under the following head: "Enriching the soil."

Early in the vacation season one of the most important phases of garden work is that of surface tillage and it is well to emphasize the necessities of good cultivation by a special consideration of such subjects as are treated of in lesson 35, "The care of the garden," lesson 36, "Weeding your garden," and lesson 40, "Mulches and how to use them."



Some garden pests are almost certain to appear in most of these gardens. When this happens it is time to teach the principal factors concerning methods of fighting injurious insects. Lessons 73, "Spraying for biting insects," and 79, "Spraying with tobacco solutions" should be helpful in this connection. It will also be desirable to teach the principal facts in regard to insect life histories by means of such lessons as 72, "The cabbage worms," 75, "The tomato worms"; 76, "The black squash bug", and 77, "The aphids or plant lice."

As opportunity offers it will also be worth while to bring home to the pupils the benefits of birds and other animals as insect destroyers in which connection lessons 85, "The chimney swift," and 86, "The toad," may be used.

All through the vacation period there are opportunities of demonstrating the best times for harvesting each crop. Lesson 89, "Quality vegetables from the garden," should be helpful in this work. The other lessons immediately after this should also be of use in improving the opportunities for selling and storing the crops.

At the risk of repetition but in the hope of being definitely helpful the following list of the lessons most likely to be useful during the summer campaign is given:

#### FERTILITY PROBLEMS.

- Lesson 10.—The kinds of garden soils.
- Lesson 15.—Humus—the food producer.
- Lesson 16.—Improving sandy soils.
- Lesson 11.—The hidden gold.
- Lesson 12.—The third plowing.
- Lesson 14.—Feeding the fish worms.
- Lesson 18.—Commercial fertilizers.

#### SUMMER PLANTING PROBLEMS.

- Lesson 8.—Succession cropping.
- Lesson 9.—Follow crops.
- Lesson 24.—Varieties of vegetables.
- Lesson 33.—Crops for late planting.
- Lesson 34.—Root crops for late sowing.
- Lesson 45.—Celery.
- Lesson 32.—Planting turnips early and late.
- Lesson 54.—Beets for both summer and winter.
- Lesson 55.—Carrots for every garden.
- Lesson 59.—Kohlrabi for young gardeners.
- Lesson 66.—Cucumbers for salads and pickles.

#### PROBLEMS OF SUMMER CULTURE.

- Lesson 35.—The care of the garden.
- Lesson 36.—Weeding the garden.
- Lesson 37.—Thinning your young vegetables.
- Lesson 38.—How to thin vegetables.
- Lesson 39.—How to transplant.

- Lesson 40.—Mulches and how to use them.
- Lesson 41.—John's dream.
- Lesson 69.—Training tomato plants.

#### PROBLEMS OF GARDEN PESTS.

- Lesson 72.—The cabbage worms.
- Lesson 73.—Spraying for biting insects.
- Lesson 74.—Applying arsenate of lead.
- Lesson 75.—The tomato worms.
- Lesson 76.—The black squash bug.
- Lesson 77.—The aphids or plant lice.
- Lesson 78.—Kerosene emulsion.
- Lesson 79.—Spraying with tobacco solutions.
- Lesson 80.—Squash and cucumber beetles.
- Lesson 81.—Cutworms.
- Lesson 82.—The corn-ear worm.
- Lesson 83.—How to fight potato pests.
- Lesson 84.—Plant diseases.
- Lesson 85.—The chimney swift—the garden ace.
- Lesson 86.—The toad—the garden tank.
- Lesson 87.—The mole—the tunnel maker.
- Lesson 88.—Witch grass—the root of garden evil.

#### HARVESTING PROBLEMS.

- Lesson 89.—Quality vegetables from the garden.
- Lesson 90.—Selling your vegetables.
- Lesson 91.—Storing your vegetables.
- Lesson 92.—Storing root crops.
- Lesson 95.—Preparing root crops for fairs and exhibitions.



## V. A COURSE IN SCHOOL-SUPERVISED GARDENING FOR NORMAL SCHOOLS IN THE NORTHEASTERN STATES.

In Part I of A Manual for School-Supervised Gardening for the Northeastern States more than a hundred lessons have been printed for the use of teachers and pupils. Most of these had been issued earlier as leaflets of the United States School Garden Army and have been widely used in the schools. These lessons are grouped under these headings:

- I. Planning the garden.
- II. Soils.
- III. Enriching the soil.
- IV. The seed.
- V. Planting the crop.

- VI. Growing the crop.
- VII. Garden crops.
- VIII. Garden pests.
- IX. Gathering and disposing of the crop.
- X. Fall gardening.

Part II of this manual is devoted to flowers, with lessons on those that have been found to be best adapted to real school work.

It is believed that these two manuals would be found useful as a basis for garden courses in normal schools, supplementing them, of course, with practical garden work and studies of other texts.

In connection with this course it will be advisable to utilize the various sections of the first four courses in this pamphlet, as it will help the normal-school pupils to a better understanding of the pedagogical contents of the garden lessons. Such a study will help them also to adapt the lessons to the various grades of the schools in which they will later be working.

In a great many States the teachers and pupils of the normal schools have been very helpful in acting as practice garden teachers in the towns where the schools are located or as summer supervisors of gardening. Such experience is of great value to young teachers, and it enables them to do more efficient work when they take positions as regular teachers.









## A GUIDE TO THE NORTH CAROLINA SCHOOL SYSTEM IN THE NORTH CAROLINA STATE

The purpose of this guide is to provide information to the North Carolina School System. It is intended to be a guide for the North Carolina School System. It is intended to be a guide for the North Carolina School System. It is intended to be a guide for the North Carolina School System.

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