BEGINNING PLANTS

NAME _____ SCHOOL _____

DATE STARTED _____ DATE COMPLETED _____

PREREQUISITE: None.

HOW TO DO THIS COURSE: Do the steps one at a time, in order. When you finish a step, put your initials and the date on the sign-off line on the right. A split line means to get a pass (and an initial) from another student (or your Academic Supervisor if it says that). A * means get a checkout. Essays and pictures are turned in to the Academic Supervisor.

PURPOSE: Learn what plants are, how they grow and what they do. Grow plants from seeds.

ESTIMATED TIME: 12 hours over 1–3 weeks.

MATERIALS NEEDED FOR THIS COURSE

Data Sheet (DS) #9801 Plant Care Checklist, attached to the back of this study guide.
Study booklet, *Beginning Plants*, with these data sheets:

2398	2399	2400	2406	2401	2402
2403	937	2404	2405	2407 (activities)	

Exams: 4479, 9760 (answers), 6580 (review), 9761 (review answers)

Other materials:
Section A: plants, ball of cotton; B: soft green leaf, access to outdoor and indoor plants; C: watering container, 5 bean seeds or radish seeds, 3-inch-wide flower pot for planting, garden or potting soil (not fortified with fertilizer), measuring spoons, alfalfa seeds from health food store (teaspoon amount), 2 clear plastic cups (or glasses) of the same size, plastic wrap, 3 rubber bands, masking tape, tall clear glass or jar, clean piece of pantyhose; E: sheets of newspaper, glue or tape, pot (twice the width of cup in C) or planter box, soil (as in C), measuring spoons; F: cross-sections of 2 different trees (showing bark, sapwood, heartwood and annual rings), pieces of hardwood and softwood; G: a flower (or picture) that shows sepals, petals, stamens, pistil, access to 3 different kinds of flowers, access to internet; H: 4 or more different kinds of seeds (to look at), several bean seeds; I: heavy pieces of paper

NOTE TO THE ACADEMIC SUPERVISOR

This course should be done during the growing season as some of its activities require the student to find and use plants that grow outside, including deciduous and evergreen plants.

A. ABOUT PLANTS

1. READ: Data Sheet (DS) #2398 Plants, Animals and Minerals. _____

2. DEMONSTRATION:
   a) Find five different plants and touch them. ___
   b) Find five different animals and touch them if you can and it is safe. ___
   c) Find five things that are minerals and touch them. ___ _____

3. DEMONSTRATION: Draw and color pictures of:
   a) a small plant ___
   b) an animal ___
   c) a mineral ___
   d) a large plant, like a tree ___ ____ ____

4. READ: DS #2399 What Is a Plant? _____

5. DEMONSTRATION: Think of three plants you have eaten and figure out if what you ate was the stalks, the seeds or fruits, the roots, the flowers or the leaves. Draw a picture of your favorite one and the plant that it comes from. ____ ____

6. ESSAY: Find three different things in your school that come from plants. Tell what they are and what plants you think they come from. ____ ____

7. DEFINE: fiber _____

8. DEMONSTRATION:
   a) Look at a ball of cotton. The fibers come from the flower of a cotton plant. Twist some cotton fibers into a thread. Threads like these are used to make cotton clothes. ___
   b) Look at the labels on your clothes (or clothes of your friends) for the word *cotton*. This means that cotton fibers from the cotton plant were used in making that piece of clothing. ___ _____

B. ROOTS AND SOIL

*1. READ: DS #2400 Roots and Soil. ____ ____

2. PRACTICAL APPLICATION: Get a green leaf, the softer the better. Squash it and feel how wet it is. _____

3. DEMONSTRATION: Before your next school day, find some weeds outside (dead or alive).

   a) Pull up a small weed as gently as you can and get as much of the root out as you can. Look at the roots. Draw a picture of the plant and its roots. ___

   b) Find a weed that you can't pull up (or one that is very hard to pull up). Get some help if you need to and pull it up or dig it up. Then look at the roots and compare them to the small weed. Draw a picture of this plant and its roots. ___ ____ ____

C. GROWING PLANTS FROM SEED

1. READ: DS #2406 Growing Plants. _____

2. DEMONSTRATION: Touch some soil that is very dry. Then touch some soil that is very wet. (You may have to pour water on the soil.) Notice the difference in how the soil sticks to your finger. Now touch some soil that is moist enough that a bit sticks to your finger, but not a lot. _____

3. DRILL: Do this with another student. Practice checking the soil moisture of different potted plants until you can easily tell whether or not a plant needs watering. ____ ____

4. PRACTICAL APPLICATION: Find three different plants that need watering and water them properly. ____ ____

5. PRACTICAL APPLICATION: Read the first page of DS #9801 Plant Care Checklist, attached to the back of this study guide, and do what it says to do. **Supervisor pass** on how you will remember to take care of your plants. ____ ____

6. PRACTICAL APPLICATION:

   a) Plant five bean seeds or radish seeds in a pot that is at least three inches wide. Follow the directions in DS #2406 Growing Plants and do steps 1 through 5. You can work with a partner if you like. If you don't have a sunny place to put the pot, ask the supervisor for help. ___

   b) Put away any extra materials and clean up the area. ___

   Supervisor pass. (Go on to the next course step immediately.) ____ ____

7. PRACTICAL APPLICATION: Read the Instructions on page two of the attached Plant Care Checklist. In the first box, write in the dates you will be checking your bean or radish plants.

   (You should take care of your plants until you finish the course by checking the soil daily, watering when needed, and marking your checklist. There is a place to sign off that you have done this at the end of the course.) _____

8. PRACTICAL APPLICATION: You will be doing the first activity in DS #2407 Activities for Growing Alfalfa, "Experiment: Plant Growth in Light and Dark." It is at the back of your study booklet.

   a) Read the Information About the Activity. ___

   b) Get the materials together that you will need. ___

   c) Do steps a)–g) of the experiment. You can work with a partner on these steps, if you like. Show your cups to the supervisor before you put them in their places. ___

   d) Read the rest of the directions in the experiment. ___

   e) Unless you can do the next project right away, put away any extra materials and clean up the space. ___

   Supervisor pass. (Go on to the next course step immediately.) ____ ____

9. PRACTICAL APPLICATION: Find the second box on the attached Plant Care Checklist and write in the dates you will be checking your alfalfa seeds.

   (Check your seeds each day, watering if they start to dry out, and marking your checklist. You should finish this experiment within a week after you start it. There is a place to sign off the completion of the experiment at step E.11.) _____

10. PRACTICAL APPLICATION: You will be doing the second activity in DS #2407 Activities for Growing Alfalfa, "Project: Growing Alfalfa Sprouts."

    a) Read the Information About the Activity. ___

    b) Get the materials together that you will need. ___

    c) Do steps a)–f) of the project. You can work with a partner on these steps, if you like. ___

d) Put away any extra materials and clean up the area. ___

Supervisor pass. (Go on to the next course step immediately.) ____ ____

11. PRACTICAL APPLICATION: Find the third box on the attached Plant Care Checklist. Write in the dates you will be checking your alfalfa sprouts.

    (You should check your sprouts each day, marking your checklist after you rinse them. There is a place to sign off the completion of the project at the end of the course.) _____

D. STEMS

1. READ: DS #2401 Stems. _____

2. DEMONSTRATION: Go outside and touch at least five of these things. Put an x by the ones you touch.

    the trunk of a tree
    the branch of another tree
    some twigs of another tree
    the branch of a bush, and some of its twigs
    a vine
    a plant with a tall stem
    a plant with a short stem _____

3. DEMONSTRATION: Draw your own picture showing the most important things the stems of plants do. ____ ____

4. DEMONSTRATION: Find a plant with no stem or a short stem (such as some grass plants). Draw a picture of it. ____ ____

E. LEAVES

1. READ: DS #2402 Leaves, section “What a Leaf Is.” _____

2. DEMONSTRATION: Find five different kinds of leaves. Look at the leaves closely. See how they are similar and different. Draw a picture of each kind and turn the pictures in to your supervisor. ____ ____

3. READ: DS #2402, section “The Parts of a Leaf.” _____

4. DEMONSTRATION: Look for the following kinds of leaves and show them to another person, explaining what kind each one is. Try to do this within 15 minutes. (If you can't find one, draw a picture of it.)

   a) three leaves that have both a blade and a leaf stalk ___

   b) a leaf that has a blade but no leaf stalk ___

   c) a plant that has needle leaves ___ ____ ____

5. READ: DS #2402, section "Shapes of Leaves." _____

6. DEMONSTRATION: Find ten different kinds of leaves. Compare the sizes and shapes of each one. _____

7. PRACTICAL APPLICATION: In this step, you will be drying leaves to make a leaf display later in the course.

   a) Collect leaves from two different plants that you know the names of. Put these between two sheets of newspaper and press them with a large stack of books or other heavy objects. This will flatten the leaves and dry them out. Write the name of the plant on the newspaper and the date you found it to help you remember later. ___

   b) Find three plants that you like but don't know the names of. Find out from someone the names of the plants and write them down. Collect leaves from the plant, press them and put them on the paper as you did in part a). ___

   You will complete your leaf display later in the course after the leaves are dry. _____

8. READ: DS #2402, sections "What Leaves Do" and "Summary." _____

9. DEMONSTRATION: Show what a leaf needs to make food and where it gets each of these things. **Supervisor pass.** ____ ____

10. DEMONSTRATION: Hold up a leaf to bright light and notice that only some of the light comes through. Part of the light is captured by the leaf to help make food for the plant. _____

11. PRACTICAL APPLICATION:

    a) Complete your Plant Growth in Light and Dark experiment by getting out your plants and looking at them. Write what happened

to the leaves and stems of the plants grown in the dark and what happened to the plants grown in the light and turn this in to your supervisor. ___

b) After you turn in your report, read DS #2407 Activities for Growing Alfalfa, section "Results of Plant Growth in Light and Dark." (It is at the very end of the data sheet.) See if what it says matches what you observed from your experiment. If your results are different, tell your supervisor why you think this happened. ___

Supervisor pass. ____ ____

12. PRACTICAL APPLICATION: You will be doing the third activity in DS #2407 Activities for Growing Alfalfa, "Project: Transplanting Alfalfa Seedlings."

a) Read the information about the activity. ___

b) Get the materials together that you will need. ___

c) Do steps a)–h) of the project. You can work with a partner on these steps, if you like. ___

d) Put away any extra materials and clean up the area. ___

Supervisor pass. ____ ____

13. PRACTICAL APPLICATION: Find the fourth box on the attached Plant Care Checklist. Write in the dates you will be checking your alfalfa seedlings.

(You will be checking the plants daily and watering them as needed for the rest of the time you are on this course. When you check the plants, notice if the plants started in the dark turn green after a few days in the light. They might turn green or they might be too weak to get fully healthy again. There is a place to sign off that you have completed the project at the end of the course.) _____

F. TREES

*1. READ: DS #2403 Parts of a Tree Stem to the heading "Tree Rings." ____ ____

2. DEMONSTRATION: Find a tree. Look at all the parts of a tree you learned about that you can see. Draw a picture of that tree. Label all the parts of the tree you have learned. Then below the picture or on

another piece of paper tell about each part (what it is or does).
Supervisor pass. ____ ____

3. DEMONSTRATION: Look at cross sections of two different trees and point out bark, sapwood and heartwood. ____ ____

4. DEMONSTRATION: Show the purpose of:
   a) outer bark ___
   b) inner bark ___
   c) sapwood ___
   d) heartwood ___ ____ ____

5. DEMONSTRATION: Show the two things the cambium does. ____ ____

6. CLAY DEMONSTRATION: Show the parts of a cross section of a tree. ____ ____

7. READ: DS #2403, section "Tree Rings." _____

8. PRACTICAL APPLICATION: Look at cross sections of two different trees.
   a) Figure out how old each tree is by counting rings. Write the numbers for each tree here: ___ years ___ years. ___
   b) For each tree, find and point out a year when the tree grew a lot, and a year when the tree grew very little. ___ ____ ____

9. READ: DS #937 Softwood and Hardwood. _____

10. DEMONSTRATION: In these demonstrations you will go outside and look for certain kinds of leaves. If you are not sure where to look, ask for help.
    a) Find a deciduous tree or bush and pick a couple of leaves. ___
    b) Find an evergreen tree or bush and pick a couple of needles. ___
    c) Show what you collected to someone who knows about trees. Tell which are needles and which are deciduous leaves. ___ ____ ____

11. DEMONSTRATION: Get a piece of hardwood and a piece of softwood and compare them. Try the fingernail test on them. _____

G. FLOWERS

1. READ: DS #2404 Flowers to the heading “Parts of a Flower.” _____

2. DEMONSTRATION: Show the purpose of a flower. ____ ____

3. READ: DS #2404, section “Parts of a Flower.” _____

4. DEMONSTRATION: Look at a flower (or a color picture) that has all the parts—sepals, petals, stamens, pistil. Draw it and label the parts. **Supervisor pass.** ____ ____

5. DEMONSTRATION: Look at three different types of flowers. If flowers are not blooming outside, ask your supervisor to help you get some flowers to look at. Try to find all the parts on each flower—sepals, petals, stamens, pistil. (It is possible that some parts may be missing.) _____

6. DEMONSTRATION: Draw a picture of each kind of flower you found and label all the parts. ____ ____

7. DEMONSTRATION: Show what petals are for and what sepals are for. _____

*8. READ: DS #2404, section “Pollination” to end of the data sheet. ____ ____

9. DEMONSTRATION:

   a) Show how an insect pollinates a flower. ___

   b) Show how a flower could be pollinated by wind. ___ ____ ____

10. DEMONSTRATION: Before you finish this course, see if you can find a flower with an insect in it. Watch the insect closely and see if you can see how it helps pollinate the flower. If there aren’t lots of flowers blooming outside, have your supervisor help you find a video of this on the internet. _____

11. CLAY DEMONSTRATION: Show how seeds are produced, starting with a flower and including pollination. This demonstration may have several parts. ____ ____

12. DEMONSTRATION: See if you can find a flower where seeds have been formed or are forming. Take the flower apart if you need to, to see the seeds inside the pistil. They might be small or large. If there

aren't lots of flowers blooming outside, have your supervisor help you find pictures of the seeds inside a flower on the internet. ____ ____

H. SEEDS

1. READ: DS #2405 Seeds to the heading "How Seeds Are Spread." _____
2. DEMONSTRATION: Show the purpose of a seed. ____ ____
3. CLAY DEMONSTRATION: Show
   a) a seed by itself ___
   b) a seed that is inside a fleshy fruit or vegetable ___
   c) a "seed" that is really the seed plus the dry ovary wall around it ___ ____ ____
4. READ: DS #2405, section "How Seeds Are Spread." _____
5. DEMONSTRATION: Show four ways seeds can be spread. ____ ____
6. DEMONSTRATION: Look at four different kinds of seeds. Notice the differences in size and shape. Try to figure out how each one is spread. _____
7. DEMONSTRATION: Before you finish this course, find as many different kinds of seeds as you can. Find at least three different kinds of seeds outdoors. Hint: Look for dried-out flowers. Look inside fruits. Find some seeds in your food. Find some weed seeds. Try to figure out how each kind of seed that you found is spread. Show your supervisor the seeds that you find. **Supervisor pass.** ____ ____

*8. READ: DS #2405, sections "Parts of a Seed" and "How a Seed Grows." ____ ____

9. DEMONSTRATION:
   a) Put several bean seeds in a cup of water to soak overnight. Continue on the next steps while you are soaking the beans.) ___
   b) Come back the next day and peel the seed coat off of the bean with your fingernails. Split the bean in half and find the embryo and embryo food. ___ ____ ____

10. DEMONSTRATION: Use alfalfa sprouts from your alfalfa sprout project (or beans if they have sprouted) and find the root, stem and leaves of the embryo. ____ ____

I. FINAL APPLICATIONS

1. PRACTICAL APPLICATION: Get the leaves you were drying on step E.7. Make a nice-looking display by gluing or taping them on heavy pieces of paper. Write the names of the plants on the paper. Also, write the date that you collected them, where you collected them, and your name. When you have finished, check with your supervisor to find out where you can display it. **Supervisor pass.** ____ ____

2. PRACTICAL APPLICATION: Look again at the sprouts you started at step C.10. You can now get them ready for eating. Do it this way. Rinse the sprouts one more time, then drain the water. Wash your hands. Then take the sprouts out of the glass with your hand. Show them to your supervisor. Now you can eat them or give them to someone else who likes to eat sprouts. (You should at least taste them even if you don't eat many.) **Supervisor pass.** ____ ____

3. PRACTICAL APPLICATION: Check the potted plants you started in step C.6 and decide what to do with them. If you have beans, you might take them home and plant them in the ground, or you may want to give them away. If you have radishes, you may want to continue growing them in the pot until they are big enough to eat. Tell your supervisor what you would like to do. **Supervisor pass** on successfully growing these potted plants. ____ ____

4. PRACTICAL APPLICATION:

   a) Look a final time at the alfalfa plants you transplanted as part of step E.12. Write a report to tell how they are doing. Are they growing or did they die? Did the plants grown in the dark eventually turn green? What else have you noticed about the plants? Turn your report in to your supervisor. ___

   b) Figure out with your supervisor what to do with the alfalfa plants. ___

   Supervisor pass. ____ ____

I have done all of the steps of this course. I understand what I studied and can use it.

Student_____ Date _____

The student has completed the steps of this course and knows and can apply what was studied.

Academic Supervisor_____ Date _____

The student has passed the exam for this course.

Examiner _____ Date _____

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PLANT CARE CHECKLIST

Name_____ Date _____

On this course, you will be growing plants and taking care of them. New plants usually need care for a few minutes each day and may die if they don't get it. On the next page there is a checklist to help you keep track of your plant care.

Here are some ways you could remember to check your plants daily:

1. Decide on a time that you will check every day. Set your watch to remind you.
2. Put something in your dictionary or lunch box to remind you.
3. Put a note on the chalkboard or bulletin board to remind you.

You can think of other ideas.

During weekends or on other days when you are not at school you will need to take your plants home or get someone else to check them.

Write down here how you will remember to take care of your plants every day and how they will be cared for on weekends.

_____

_____

_____

_____

_____

_____

_____

_____

CHECKLIST

Instructions: When you start each activity, write in the date (such as Monday, May 4) for each day that you will be caring for a plant. Then each day as you check your plants make a mark after you have checked. Write "W" when you water.

Daily Care of Beans or Radishes (steps C.6 and C.7)

	Date	Mark		Date	Mark
Day 1	_____	_____	Day 6	_____	_____
Day 2	_____	_____	Day 7	_____	_____
Day 3	_____	_____	Day 8	_____	_____
Day 4	_____	_____	Day 9	_____	_____
Day 5	_____	_____	Day 10	_____	_____

Experiment: Plant Growth in Light and Dark (steps C.8 and C.9)

	Date	Mark		Date	Mark
Day 1	_____	_____	Day 4	_____	_____
Day 2	_____	_____	Day 5	_____	_____
Day 3	_____	_____	Day 6	_____	_____

Project: Growing Alfalfa Sprouts (steps C.10 and C.11)

	Date	Mark		Date	Mark
Day 1	_____	_____	Day 6	_____	_____
Day 2	_____	_____	Day 7	_____	_____
Day 3	_____	_____	Day 8	_____	_____
Day 4	_____	_____	Day 9	_____	_____
Day 5	_____	_____	Day 10	_____	_____

Project: Transplanting Alfalfa Seedlings (steps E.12 and E.13)

	Date	Mark		Date	Mark
Day 1	_____	_____	Day 6	_____	_____
Day 2	_____	_____	Day 7	_____	_____
Day 3	_____	_____	Day 8	_____	_____
Day 4	_____	_____	Day 9	_____	_____
Day 5	_____	_____	Day 10	_____	_____

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