



Plant Science

Scouts BSA · Nature

Name

Started

Completed

Plants feed us, clean the air, and make our world beautiful. You'll learn how plants work, grow some of your own, and explore what makes them thrive. It's a great badge for curious minds and gardeners.

Requirements

Every official requirement, in plain language. Check the official wording when you sign off (scouting.org/merit-badges/plant-science/). Tips and examples are ideas, not extra requirements.

- ☐ 1 Draw a flowering plant, label at least five of its parts, and tell what each part does

Tip: Pick a flower from your yard, with permission, and draw it while labeling each part.

Example: Pick a flower like a lily or tulip, with permission, and cut it in half lengthwise. Draw and label the petals, sepals, stamens with anthers and filaments, and the pistil with its stigma, style, and ovary.

- ☐ 2 Explain photosynthesis and why it matters, and give at least five ways people depend on plants

Tip: Make a list of foods, clothes, and medicines that come from plants.

Example: Explain photosynthesis simply: leaves use sunlight, water, and carbon dioxide to make sugar and release oxygen. Then list what you used today that came from plants: cereal, cotton shirt, wooden pencil, paper, and some medicines.

- ☐ 3 Explain why honeybees and other pollinating insects matter to plants

Tip: Watch bees and butterflies in a garden and notice which flowers they visit.

- ☐ **4** Explain the effects of light, water, air, temperature, and pests on plants. Describe what soil is, what it does, and why it matters, including the texture, structure, and makeup of fertile soil and how to improve soil

Tip: Grow two plants in different light or soil and compare how they do.

Example: Grow two pots of beans, one in a sunny window and one in a dim corner, or one in garden soil and one in sand. Measure them each week and explain what light, water, and soil nutrients did.

- ☐ **5** Tell how plants are propagated by seeds, roots, cuttings, tubers, and grafting, then grow a plant using one of those methods

Tip: Try growing a plant from a seed or cutting, and keep a log of how it changes.

Example: Explain how plants grow from seeds, roots, cuttings, tubers, and grafting. Then root a cutting from a pothos or coleus in a glass of water, plant it in soil once roots form, and keep a photo log of its growth.

- ☐ **6** List by common name at least 10 native and 10 cultivated plants that grow close to home. Name five non-native invasive plants found locally and the harm they do, and tell how to prevent or control their spread without hurting people, wildlife, or the environment

Tip: Walk around your neighborhood with a field guide and sort plants into native, cultivated, or invasive.

Example: Make three lists from a neighborhood walk: native plants like a local oak or wildflower, cultivated plants like tomatoes or roses, and invasive plants listed for your state. Your extension office or state invasive list can help.

7 Careers or hobbies: Choose 1 of 2

Tips for this section: Talk with a gardener, farmer, or county extension agent about plant careers.

- ☐ **7a** Research one career related to plant science: training and education, costs, job outlook, pay, duties, and advancement. With a parent's or guardian's permission, you may search online or at a library, interview a professional, or visit a workplace. Discuss your findings and what makes it interesting with your counselor

- ☐ **7b** Research how plant science skills could become a hobby or part of a healthy lifestyle, including training, costs, and groups that support it. Discuss with your counselor the short- and long-term goals you might set

8 Specialty option: Choose 1 of 3

Tips for this section: Choose the option that interests you most and plan time for it to grow.

8a Agronomy

- ☐ **8a1** Describe how a seedbed is prepared

- ☐ **8a2** Build a seed germination tester and use it on 50 seeds each of four of these: wheat, rye, barley, rice, corn, cotton, soybeans, alfalfa, or clover. Work out what percentage of the seeds are alive

- ☐ **8a3** For corn, small grains, and cotton, explain one major insect pest and one major disease that harm each. Collect and name five local weeds that compete with crops, and tell how to control them without hurting people, wildlife, or helpful insects

- ☐ **8a4** On a U.S. map, mark the main growing regions for corn, cotton, forage crops, small grains, and oil crops, and explain how each region's climate and location make it a top producer

8a5 Crop alternative: Choose 1 of 5

8a5a Corn

- ☐ **8a5a1** Grow a plot of corn, have your counselor inspect it, and record the seed variety or experimental code number

- ☐ **8a5a2** Describe today's commercial corn-farming methods and how corn adds to our food and fuel supply

- ☐ **8a5a3** Describe one insect that harms corn, how it affects the crop, and how it's controlled

8a5b Cotton

- ☐ **8a5b1** Grow a plot of cotton and have your counselor inspect it

- ☐ **8a5b2** Describe today's commercial cotton-farming methods, how cotton fiber and seed are used, and the crop's economic value

- ☐ **8a5b3** Describe one insect that harms cotton, how it affects the crop, and how it's controlled

8a5c Forage crops

- ☐ **8a5c1** Collect, count, and label display samples of broadleaf weeds, legumes, annual grasses, and perennial grasses, and tell how each grass and legume is used. Log where you found each sample and share the log with your counselor

- ☐ **8a5c2** Explain how legumes can enrich soil and how they can sometimes deplete it, and how livestock can enrich or deplete soil

- ☐ **8a5c3** Name five plants that are poisonous to livestock, and tell the different ways forage crops are used to feed livestock

8a5d Small grains

- ☐ **8a5d1** Give production figures for small grain crops for the latest year available in the U.S. Statistical Report or the Agricultural Statistics Handbook

- ☐ **8a5d2** Help harvest a grain crop. Tell how to cut harvesting losses and describe modern methods for growing one small grain crop

- ☐ **8a5d3** Visit a flour mill, grain elevator, cereal plant, or feed or seed company and talk with the operator. Take notes, describe how they process grain, and share what you saw with your patrol, troop, or class

8a5e Oil crops

- ☐ **8a5e1** Grow a plot of soybeans and have your counselor inspect it

- ☐ **8a5e2** Describe modern large-scale commercial soybean growing and how soybeans add to our food supply

- ☐ **8a5e3** Explain why a hard frost can hurt soybeans right after they come up

8b Horticulture

- ☐ **8b1** Visit a public garden, arboretum, retail or wholesale nursery, production greenhouse, or conservatory greenhouse, and tell what you learned there about horticulture

- ☐ **8b2** Explain these terms: annual, perennial, evergreen, deciduous, cultivar, habit, texture, ultimate size, native habitat, hardiness zone, shade tolerance, moisture requirement, pH, and disease resistance. Look up your hardiness zone and name 10 landscape plants you like that fit your climate, by common and scientific name

8b3 Propagation, pruning, or planting: Choose 1 of 4

- ☐ **8b3a** Explain how vegetative and sexual propagation differ and some horticultural advantages of each, then start a plant from a graft or a stem or root cutting

- ☐ **8b3b** Move 12 seedlings or rooted cuttings into larger containers and grow them for a month or more

- ☐ **8b3c** Show good pruning methods and explain why pruning matters

- ☐ **8b3d** With permission, properly plant a tree or shrub in a suitable spot

8b4 Landscape design

- ☐ **8b4a** Explain why good landscape design matters, along with choosing plants that fit a site's conditions

- ☐ **8b4b** Tell why you need to know how large a plant will grow

- ☐ **8b4c** Tell why a slower-growing landscape plant is sometimes a better pick than a faster-growing one

8b5 Horticulture alternative: Choose 1 of 4

8b5a Bedding plants

- ☐ **8b5a1** From seed or cuttings, grow bedding plants that suit your region in flats or pots, using a manufactured soil mix. Tell what the mix contains and why you picked it

- ☐ **8b5a2** Move the plants into a landscape bed and care for it through the end of the growing season. Record what you did and saw, materials used, and costs

- ☐ **8b5a3** Demonstrate watering, weeding, mulching, fertilizing, and deadheading, and explain how each one helps your plants

- ☐ **8b5a4** Describe some differences between gardening with annuals and with perennials

8b5b Fruit, berry, and nut crops

- ☐ **8b5b1** Plant five berry plants, grapevines, or fruit or nut trees that suit your area, and fully care for them through one season

- ☐ **8b5b2** Properly prune a tree, vine, or shrub, and explain why pruning is needed

- ☐ **8b5b3** Demonstrate one kind of graft and tell why it's useful

- ☐ **8b5b4** Describe how a fruit, nut, or berry crop gets processed before people use it

8b5c Woody ornamentals

- ☐ **8b5c1** Plant at least five trees or shrubs in a landscape and fully care for them for one growing season

- ☐ **8b5c2** Properly prune a tree or shrub, and explain why pruning is needed

- ☐ **8b5c3** List 10 more trees (beyond those from requirement 6) with common and scientific names, and explain to your counselor how each one is used in landscaping

- ☐ **8b5c4** For each type of tree or shrub, describe its size, texture, color, flowers, leaves, fruit, hardiness, growing needs, and any special features that make it attractive or interesting

- ☐ **8b5c5** Tell five ways trees make our environment better

8b5d Home gardening

- ☐ **8b5d1** Design and plant a garden or landscape of at least 10 by 10 feet

- ☐ **8b5d2** Plant 10 or more kinds of plants in your garden, explain why you picked those vegetable and flower varieties, and care for the garden for one season

- ☐ **8b5d3** Demonstrate pruning, pest management, fertilizing, composting, mulching, weeding, watering, staking, and soil preparation, and tell why each is used

- ☐ **8b5d4** Name four kinds of things you could add to make your home landscape or a park better for birds and wildlife. List 10 native plants in your area that help birds and wildlife, by common and scientific name

8c Field botany

- ☐ **8c1** Visit a natural area near home, such as a park, forest, or Scout camp, and do 8c1a through 8c1c while there

- ☐ **8c1a** Find which plant species are largest and which are most plentiful, and note whether they shade other plants

- ☐ **8c1b** Use maps, books, or the internet to describe environmental factors that may affect which plants grow there: climate, latitude, geology, topography, hydrology, soil type and pH, and air and soil temperature

- ☐ **8c1c** Record how the plants differ at a forest edge, beside water, where there was a fire, or along a road or railroad

- ☐ **8c2** Pick a study site of at least 100 by 100 feet. List 10 trees or shrubs (woody plants) and 10 non-woody plants there, and find out which are native and which are exotic

- ☐ **8c3** Explain how plant identification keys work, then use a simple one to name 10 kinds of plants beyond those from requirement 5. Explain how common and scientific names differ and why scientific names matter

- ☐ **8c4** With permission, collect 10 different common local plants, then identify, press, mount, and label them. Tell why voucher specimens are important for recording a field botanist's finds

- ☐ **8c5** Get a list of your state's rare plants. Tell what your state is doing to protect them and its natural areas, and write a paragraph about one of those rare plants

8c6 Field botany alternative: Choose 1 of 5

8c6a Tree inventory

- ☐ **8c6a1** Identify the trees in your neighborhood, a park, part of your town, or a Scout camp

- ☐ **8c6a2** Document your inventory by collecting, pressing, and labeling leaves, flowers, or fruits

- ☐ **8c6a3** List the tree types by scientific and common name. Record how many trees you saw and their size (diameter 4½ feet above ground), and find the largest of each species in your area

- ☐ **8c6a4** Show two or more people how to identify at least five kinds of trees or shrubs with a leaf or twig key

8c6b Transect study

- ☐ **8c6b1** Visit two sites, at least one different from your Field Botany requirement 1 site

- ☐ **8c6b2** Use transects at least 500 feet long to compare the two different types of plant communities

- ☐ **8c6b3** At each site, record the soil and other influencing factors, then (a) identify every tree within 10 feet of your transect line and (b) measure each one's diameter 4½ feet above the ground, mapping and listing each tree. Then graph or chart your results

8c6c Nested plot

- ☐ **8c6c1** Visit two sites, at least one different from your Field Botany requirement 1 site

- ☐ **8c6c2** Lay out nested plots to take inventory of two different types of plant communities

- ☐ **8c6c3** At each site, record soil and other influencing factors, then: (a) identify, measure, and map every tree in a plot 100 by 100 feet (diameter at 4½ ft for trees over 3 in.); (b) identify and count every tree and shrub in a 10-by-10-foot plot inside it; (c) identify and count all plants in a 4-by-4-foot plot inside that, estimating cover for ones you can't tell apart. Graph or chart the results

8c6d Herbarium visit

- ☐ **8c6d1** Write ahead to set up a visit to an herbarium at a botanical garden, park, or university, OR visit an herbarium website with your parent's or guardian's permission

- ☐ **8c6d2** Tell how the specimens are organized and how researchers use them. If you can, look at voucher specimens of a plant that's rare in your state

- ☐ **8c6d3** Describe how a voucher specimen gets mounted and readied for long-term storage, and how to handle specimens so they don't get damaged

- ☐ **8c6d4** Tell about the tools and references botanists use in an herbarium

8c6e Plant Conservation Organization Visit

- ☐ **8c6e1** Write ahead to set up a visit to a private conservation group or government agency that works to protect rare plants and natural areas

- ☐ **8c6e2** Tell about the organization's work to study and protect rare plants and natural areas

- ☐ **8c6e3** If you can, visit a nature preserve the organization manages, and tell about land management practices there, such as controlled burns or efforts to remove non-native invasive plants or other dangers to native plants

- ☐ 9 Discuss why Leave No Trace's Seven Principles and the Outdoor Code matter in plant science, and explain how you followed them in natural areas while observing, collecting, and identifying plants

Tip: Talk about how to enjoy plants in the wild without picking or trampling them.