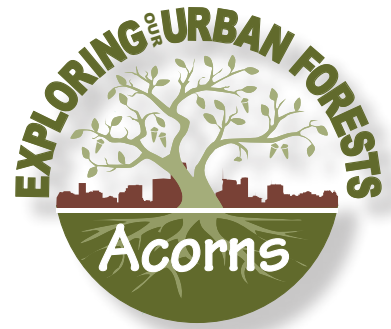


Acorn Planting



Learning Outcomes

Students will learn how to plant a tree seed (acorn) and what resources a tree needs to grow.

MATERIALS

Acorns - about 50 per class to yield at least 9-10 healthy acorns to plant

For testing acorns:

- Bowls or containers for water – 1 per group
- Paper towels or towels – 1 per group

For storing acorns:

- Gallon zip-lock plastic bags
- Paper towels and water to moisten them
- Refrigerator

Getting Ready

Determine which of the following options you would like to do with your class:

Option 1: Plant acorns on public lands.

Option 2: Plant acorns on your school site or nearby nature area.

Option 3: Participate in an oak planting event.

Read one of the following guides that provides good background information about the process of collecting, testing, and storing acorns, and caring for seedlings:

http://www.sactree.com/assets/files/guides/STF_AcornGuide_5.pdf or “How to Collect, Store and Plant Acorns,” attached at the end of this lesson. More resources are available at Other oak regeneration resources:

http://www.californiaoaks.org/html/oak_tree_care.html

Collect acorns, or ask a local park ranger, urban forester or gardener to collect acorns in the fall.

Steps for planting acorns to grow oak trees:

1. Identify the planting site.
2. Collect acorns in the fall.
3. Test and store acorns for 1-3 months in a sealed plastic bag in the refrigerator.
4. Lay acorns on their sides and plant one-inch deep in the soil.
5. Keep the area around planting spots free of weeds.
6. Use screen cages to protect young seedlings from animals.
7. Water several times during the summer, for the first three years.

Most foresters recommend that acorns be planted, instead of seedlings grown from acorns. Oaks grow a long taproot, and it is difficult to get seedlings that have a healthy taproot and to plant them without damaging the roots. Many acorns can be planted in an area, and then seedlings thinned (removed) if too many sprout and grow.

Directions for steps 1 and 3 are provided in this lesson and the one-page handout for students, "Hand-on Activity: Collect, test and store acorns until planting." The other steps are provided in the five-page guide, "How to collect, store and plant acorns," a Bulletin of the California Oak Foundation. It is best to work with a professional forester, arborist or park ranger to plant acorns and care for seedlings.

Identify the planting site:

Identify an area where students will be able to plant acorns. Plan ahead and schedule a date for planting by October. Most planting occurs in November through January.

Option 1: Plant acorns on public lands

Contact park or open space ranger in your city or community. Ask if they have any areas that are suitable for more oaks to grow and are near your school. Consider offering the students (or an after-school garden club) to water and weed the seedlings in the next three years. Coordinate transportation for your students to the location for the acorn planting and care of the seedlings.

Option 2: Plant acorns on your school site

Select a site at least 50 feet from other plantings. Site should be on a sufficient slope that there will not be standing water during heavy rain periods. Acorns

can be planted in several locations within the area. If too many seedlings grow, some of them can be thinned (removed) when they are six feet tall. Contact your local park ranger or urban forester to make sure it is a good planting area for oaks, and that you are planting an appropriate species. Get approval from your school groundskeeper and principal.

Option 3: Participate in an oak planting event

Contact local park rangers about planting events in your area. Participate in the planting event. Return each year to help with watering and weeding. Coordinate transportation for your students to the location for the acorn planting and care of the seedlings.

Contact the following for acorn planting projects and expertise:

Friends of Rose Canyon - <http://www.rosecanyon.org/index.html>

Earth Discovery Institute - <http://www.earthdiscovery.org/>

County parks - <http://www.co.san-diego.ca.us/parks/>

City parks - <http://www.sandiego.gov/park-and-recreation/parks/oscp/>

Cleveland National Forest - <http://www.fs.usda.gov/cleveland>

California Urban Forests Council, www.caufc.org

Professional Tree Care Association. www.ptca.org

International Society of Arboriculture, www.isa-arbor.com

Learn more about acorn and seed viability:

Students can dissect and observe acorns, even if there are no opportunities to plant acorns. Some acorns are not healthy; that is, they sink when tested and will not sprout and produce seedlings. These acorns may be damaged by insects or not completely formed. Acorns with pinholes may indicate insect activity inside. If the seed rattles, it is likely to be dried out and probably won't germinate.

Ask the students to propose ideas or hypotheses about why the "floaters" acorns don't sink with the rest. Record their ideas on chart paper or a blackboard and then allow them to open the "floaters" to investigate the contents. Provide students with a variety of tools to break open the acorns. Prepare them for finding larval worms and other surprises.

Learn more about oaks and oak habitats:

Oak communities are one of the richest habitats for wildlife. Healthy oak woodlands can support up to 350 species of animals. This includes many insects, birds, reptiles and amphibians, and mammals.

Oaks are common in San Diego. Canyon live oaks are found at lower elevations and in urban canyons. Coast live oaks and Engelmann oaks grow in meadows in East County. Black oaks grow in the mountains. Students can read “Life in an Oak Community” that is included in Grade 5/Lesson 2.

Acorns: Student Handout



HANDS-ON ACTIVITY

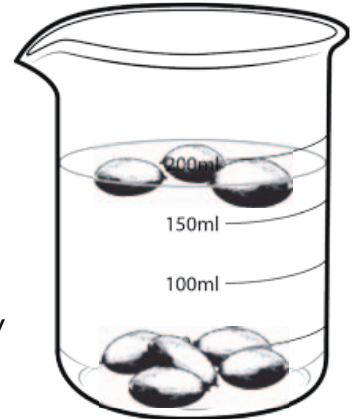
Collect, Test, and Store Acorns Until Planting



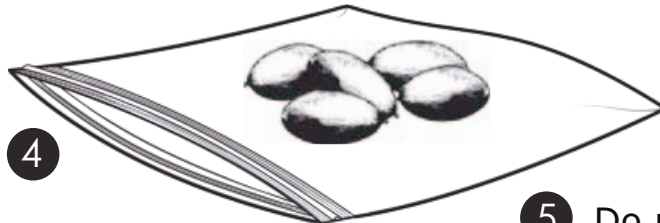
- 1 Collect acorns that have recently fallen or can be removed from the tree easily by gently twisting acorn cup or cap.

Remove all acorn caps and test for viability (ability to sprout). Place the acorns in water, discard any acorns that float and retain those that sink.

2



- 3 Surface dry acorns by placing on towels for half an hour.



Place dry acorns in a plastic bag without soil.

4

- 5 Do not seal.



- 6 Label with collection location and date.

Collection Location:

Park Somewhere

Date Refrigerated:

Month-Day-Year

7

Acorns may be refrigerated for 4 - 12 weeks. Check acorns every week to make sure harmful molds are not developing and that acorns are not beginning to germinate. If they are, plant as soon as possible.

Note: Illustrated above are basic acorn planting guidelines. For more in depth information on acorn propagation go to www.ucanr.org/oak_range and refer to "Regenerating Rangeland Oaks in California."



Is it GSOB?
www.gsob.org

UC
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How to Collect, Store, and Plant Acorns

A Bulletin of the California Oak Foundation

Oak habitats in California, particularly those along streams and rivers, and those containing valley and Engelmann oaks, have been greatly reduced over the past forty years. Additionally, three species of native oaks, the valley, blue, and Engelmann, are reportedly regenerating poorly in portions of the state. Because of this habitat loss and poor natural regeneration, many Californians are concerned about the long-term fate of these species.

Concern for California's native oak heritage has generated tremendous statewide interest in planting oaks. Planting efforts can assist Mother Nature in establishing sufficient young seedlings to replace trees that die or are removed, and may ensure that the magnificent native oaks, which have graced our valleys and hillsides for thousands of years, will be around for the enjoyment of future generations.



Collecting Acorns

Acorns can be collected either directly from the trees or from the ground beneath. The healthiest acorns, however, are generally those picked from the trees because those that fall to the ground often dry out and are damaged – especially if they lay exposed for more than a few days during hot and dry weather. If you do collect acorns from the ground, leave behind those that are very small, cracked, or feel light and hollow. Acorns collected directly from the trees can be handpicked or knocked to the ground using long poles or pieces of plastic pipe. It is easy to pick them up if tarps are placed under the trees first.

The best time to collect acorns is in the early fall, when they are just starting to turn from green to brown, and when some are starting to fall. It is probably too early to collect them if they are all dark green and it is difficult to remove their caps (the cup covering the rounded end). In this case, wait a few weeks and check them again.

Acorn Sources

Many of those concerned about California's natural environment, including foresters, conservation biologists, ecologists and horticulturists, believe that using local seed is best for maintaining the integrity of local oak populations. Because local populations may have evolved certain genetic traits that favor survival at a particular site, acorns of the same species but from different locations may be genetically very different. By planting only local acorns, you maximize chances for survival and minimize damaging the local stock by introducing poorly-adapted genes.

Ideally, acorns should be collected on the intended planting site or as close to the site as possible. In considering site similarity, match the soil, slope, exposure to the sun, and elevation whenever possible. If acorns from different sites are collected, bag them separately, with species, date, and location noted. In all handling, keep these collections separate.

Storing Acorns

Before storing acorns, take off their caps. If the acorn is ripe, the cap should come off easily when twisted. After removing the caps, rinse the acorns in cool to lukewarm water to which some bleach has been added (about ½ cup per gallon) as a disinfectant to reduce mold. Remove any acorns that float or have holes, cracks, or other problems, then lay the rest out on towels, newspapers, or other absorbent material to air dry. Pack into zip-lock bags labeling each bag for species, date and location. Since acorns are alive and respirating, they generate heat. If too many acorns are stored together, they can heat up even in a refrigerator. Therefore, avoid storing more than three cups of acorns in one container. Using small to medium zip-lock bags will correctly limit the number of acorns stored together.

After acorns are placed in plastic bags, they should be kept refrigerated until they are planted. Cold storage reduces metabolic activity and the depletion of stored reserves. A recent study also indicated that one month of cold storage also promotes faster and more complete germination. Acorns cannot be stored successfully, however, for more than a few months and should be planted in the growing season following collection. Store as cold as possible, but keep temperatures above freezing. Check acorns occasionally for molds. If molds do develop, take the acorns out and rinse them, then put them back in the refrigerator.

Another problem that can develop in cold storage is premature germination. Blue oak acorns are especially prone to this. The white tips emerging from the pointed end of the acorn are actually the beginnings of the new root system. Once these roots have grown for a few weeks, they can start to rot. Therefore, if you see the acorns starting to germinate, it is best to plant them as soon as possible.

Planting Acorns

Acorns can be planted from early November, after the first rains have soaked the soil, until early March. Acorns planted late in the season – March, or even February in dry years – will need to be irrigated. Another reason to plant acorns early is that the sooner they are planted after one month of storage in the refrigerator, the sooner they start to grow. Early planting maximizes root development before the arrival of dry weather, and also reduces the risk associated with premature germination.

Plant the acorns about one inch below the soil surface. Dig a hole using a hand trowel, hoe, or shovel. It is best to dig the hole several inches deeper than the acorn will be planted, then partially refill the hole with loose soil and tamp firm. This gives the new root a chance to get a good start in soft soil that is easy to penetrate. To further encourage rapid root and seedling development, use an auger to dig an even deeper hole, then refill and tamp the soil.

If the acorns have germinated, try not to break the root tip, and position in such a way that the root is pointing down. If the root is three inches or longer, its tip can be pruned back to two or three inches; usually the root will branch and regrow from this point. It is easier to trim the root than to plant a tangled root. Ungerminated acorns can be placed on their side in the hole and covered with soil.

The site where you choose to plant the acorns may be critical to the survival of the resulting seedlings. Choose a sunny spot that has loose, well-drained soil and is fairly free of weeds. Also, avoid areas where there are numerous gopher holes or evidence of ground squirrel activity. If you do feel that the acorns may be threatened by rodents such as squirrels or mice, plant them a little deeper – say, two to three inches below the surface. The deeper the acorns are planted, the harder it is for these animals to dig them up. However, if they are planted too deep, they may exhaust themselves before reaching the surface.

The number of acorns to plant in a given area will depend on how many trees you eventually want to grow there. Unfortunately, it is very difficult to predict how many seedlings – let alone trees – will be produced from acorns planted, since this depends on a variety of uncertain factors including weather, animals, and competing vegetation. When deciding how many acorns to plant, consider spacing the acorns in a naturalistic manner, rather than orchard style, using the pattern of surrounding naturally-occurring oaks as a template. Also look at the types of oak trees growing nearby. Is there only one species or are there two or more? Does one species occur in the draws and another on drier sites? Your careful observations will help you select both safe sites for the acorns and a more natural mix of species. If the naturally-occurring trees have an average spacing of twelve to fifteen feet, in a clumped arrangement, plant your acorns every six to ten feet, also in a clumped arrangement. Not all the acorns are going to survive, and sixty to seventy percent survival with protection and irrigation is considered good.

Acorn and Seedling Care and Protection

The amount of care and protection you choose to provide acorns and seedlings will depend on your individual situation. If you are interested in establishing only a few trees around your home, you may be willing to invest the time in watering, weeding, and protecting individual plants. If you want to plant many acres, such care of each seedling is impossible. Below are some steps you can take to help improve your chances for successful seedling establishment.

Weeding and Mulching

An important factor that often limits growth and survival of young seedlings is dry soil. Competing vegetation often uses up so much water from the soil that little is left for oak seedlings. It is therefore recommended that a circle two feet in radius around planting spots be “scalped” or scraped to remove other vegetation. Placing some type of mulch, such as hay, bark chips, rice hulls, or black plastic around the seedling will help conserve moisture and eliminate competing vegetation. Some mulches, like hay, may introduce weed seed and add to eventual problems. Black plastic, on the other hand, needs to be anchored, usually with wire pins.

Irrigating

Irrigation is not always necessary, especially with acorns that were planted in the fall. However, two or three deep waterings (three to four gallons per seedling) during each of the first several

summers following planting or during prolonged periods of hot, dry weather, can enhance seedling growth and survival. Remember that California's oaks are well adapted to dry conditions and after the first several years should be able to withstand dry summer conditions. Even if a seedling appears to die during drought, it may put out new shoots the following year.

Protecting seedlings

Since acorns are an important food source for a tremendous variety of animals, there is always a risk that the acorns you plant will be dug up and eaten. Also, as the seedlings start to grow in the spring, there is a chance that the tender young shoots will be eaten by livestock, rabbits, grasshoppers, or other animals. In general, above-ground protection of some kind is necessary and will reduce the risks of injury to both acorns and seedlings. Following are descriptions of three devices that offer protection to acorns and seedlings.

- 1) Use an 18 x 18-inch piece of aluminum screen formed into a five-inch diameter cylinder and stapled to a wooden stake. Fold the cylinder closed at the top. Drive it into the ground so that the screen cage covers the spot where the acorn is planted. This cage will keep out rodents, insects, and deer.
- 2) This cage consists of a screen cylinder like the one pictured below, placed around a one-quart yogurt or cottage cheese container that is open at both ends. Place the container in the soil so that the top is at the soil surface. This protective cage will not only prevent stem damage, but will keep out burrowing animals such as gophers who often damage roots.
- 3) This cage is a cylinder made of quarter-inch hardware cloth. One cylinder can be placed above ground and another below ground if rodents are a problem. Although expensive, these cages can be built before going into the field and do not require staking.

Young oaks can grow fairly fast if the site is favorable and there is good weed control. If you have used cages, check them to prevent young shoots from getting "choked" in the wire. If possible, replace small cages with larger mesh hog-wire (three inches in diameter and four feet tall) or chicken-wire cylinders to protect the young oaks from deer or rabbit browsing. Once the trees are about four or five feet tall, they are on their own!

Steps for Growing Oak Seedlings

- Collect acorns in the fall
- Store acorns for one month in a sealed plastic bag in the refrigerator
- Lay acorns on their sides and plant one-inch deep in the soil
- Keep the area around planting spots free of weeds
- If possible, water several times during the summer, and use screen cages to protect young seedlings from animals.

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The California Oak Foundation is dedicated to the conservation and perpetuation of California's native oak woodlands. The California Oak Foundation educates the general public and decision-makers about the importance of oak woodlands to California's wildlife habitat, watersheds, and quality of life through its newsletters, website, bulletins, books, symposia, and workshops.

Founded in 1988, the California Oak Foundation is a non-profit 501(c)(3) corporation that relies on memberships and donations to continue its work. Join us today and invest in the future of California's oak heritage.

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