

Acorn Sink or Float Experiment

Overview: Oak trees are incredibly valuable keystone species. Allowing kids to collect and test acorns for viability offers connections to the oak life cycle and conservation, as well as an opportunity to positively impact the environment by sprouting and planting an oak seedling.

Materials:

- Collected acorns
- Water
- Container for holding water
- Magnifying glasses (optional)

Approximate Time to Complete: 30 Minutes

Location: Indoor or Outdoor

Grades: All Ages

Season: Fall, Winter, Spring

Background Information: Oak trees (*Quercus* spp.) support a huge diversity of life forms — more than any other genus of trees in North America. They provide food to many birds, mammals, insects, and humans by producing acorns and dense canopies of leaves. Their branches, bark, trunks, and hollows provide habitats for many creatures. Their leaf litter can last for several years after it falls, protecting creatures in the soil and providing shelter for small animals in winter. Oak trees are drought tolerant. Their broad canopies and extensive root systems help to keep soil temperatures down and moisture levels up during hot, dry seasons. Their roots also help to prevent soil erosion to protect watersheds and sequester large amounts of carbon.

Oak trees grow from acorns, which are nuts that the trees produce either in fall or spring, depending on the species. Acorns are comprised of a cupule (a scaled cap that forms on the top of the nut), a pericarp (a hard outer wall), a seed coat, and the seed embryo within. With so many animals interested in eating acorns, finding an undamaged one with the potential to sprout requires observation and testing. Nonviable acorns float in water due to the presence of air underneath the pericarp, which indicates that the new plant inside has been exposed to the elements and will likely not germinate or grow. Viable acorns sink in water, indicating that the new plant is solid and healthy and will likely sprout into a sapling.

Instructions:

1. Have kids help gather acorns from a nearby oak tree. Any species works for this experiment. Choose ripe acorns that are brown and glossy, and make sure to gather both from beneath the tree and from the tree branches to offer the best chance of collecting both viable and nonviable specimens.



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2. Ask kids to remove the cupules and examine the collected acorns and separate them into potentially viable and nonviable piles based on observations. Acorns with small holes or cracks in them, wrinkled pericarps, signs of mold, or that rattle when shaken are likely nonviable. Acorns that are unblemished, do not rattle, and feel solid are likely viable.
3. Ask kids to hypothesize whether nonviable acorns will sink or float in water. Then, have them form another hypothesis about whether viable acorns will sink or float in water.
4. Time to test! Have kids fill a container with water and put the entire nonviable pile into the water. Ask them to record observations of what happens, then remove all the floating acorns into one new pile and all those that sink into another new pile. Repeat this process for the viable pile.
5. Discuss kids' observations with them and ask them to conclude whether viable and nonviable acorns sink or float, respectively.
6. Unless you are planning to propagate the viable acorns, return all collected acorns back beneath the tree they were harvested from so they can be useful to the many animals that rely on them.
7. (Optional) Acorns from some oaks can be planted right away, but others require cold stratification for several months before sprouting. If you're unsure what type of acorn you have or have a species that needs stratification, try storing them between damp paper towels in a plastic bag in the refrigerator. Check acorns every week to make sure they don't dry out and to see if they've germinated. Some acorns will start showing roots after about a week or so, while those requiring stratification will start rooting after about two to three months.

Once roots have grown longer than an inch, plant the germinated acorns in containers or in a location where they can receive care for the first 1-2 years before being planted in their permanent location. Acorns should be planted on their sides, with roots facing downward about an inch into the soil. With sun and regular watering, a seedling should grow! Remember that oak trees grow to be very large, so choose a permanent location for your tree with plenty of space.

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