

# How to Kill a Dandelion

## Method

Students will try to kill all the dandelions in their test plot without harming nearby plants.

## Getting Ready

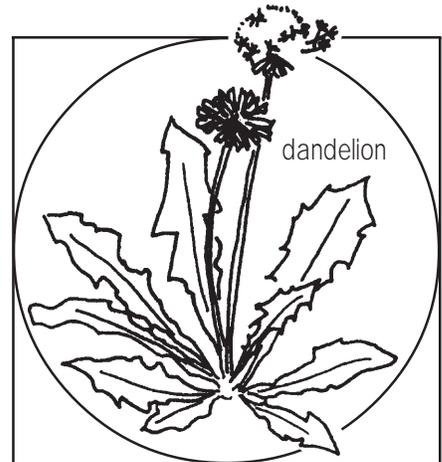
1. Find a location that can be used for experiments. The location should have an abundance of dandelions. It should be off the beaten path, yet easily accessible. Be sure to get permission to conduct the experiments. Alert maintenance staff not to use “weed and feed” or other lawn treatments in the study area. Alternatively, students could work individually or in pairs on test plots in their own lawns. The advantage is that they can observe the test plots more easily; the disadvantage is that it will be more difficult for you to monitor progress.
2. Mark off an area for each group of three to four students. Use tent stakes or wooden posts for temporary markings, or borrow equipment used to paint lines on sport fields for a more complete grid.

## Introducing the Activity

Homeowners and farmers know how hard it is to kill a dandelion. Their deep taproots, fast growth, and numerous seeds make them formidable opponents. While dandelions are not considered an invasive plant, they are convenient and serve as ideal experimental plants for discovering the challenges of controlling the growth and spread of invasives.

## Doing the Activity

1. **Investigate dandelions.** Encourage students to find out all they can about dandelions. They will need to know how to identify dandelions at several different life stages (e.g., seedling, mature plant, flowering plant, plant that has gone to seed). In order to successfully eliminate dandelions, students will need to know about the plant’s strengths and weaknesses. You can use the information on page 112 as a supplement. To help younger students learn about dandelions, read *The Amazing Dandelion* by Millicent E. Selsam.
2. **Divide into groups of three to four students.**
3. **Visit the study site and assign plots.** Don’t forget to set aside several test plots as controls.



## Objectives

- Design a simple experiment using the scientific method.
- Discover some of the variables that affect the control of invasive species.

## Grades

2 – 12

## Group Size

Small groups of 3 – 4

## Activity Time

One or two 50-minute periods for experimental design, monitoring for several weeks

## Setting

Outdoors

## Materials

- Copies of *Meet the Dandelion* (page 112)
- Tent stakes and string to mark test plots
- Writing boards, lab notebooks, pencils
- Weed diggers
- Other tools or materials that groups need to conduct their experiments (approved by teacher!)

## Connections

See next page.

## Academic Standards

### Grades 2 – 4

- Environmental Education: A.4.1, A.4.2, B.4.6
- Science: B.4.1, C.4.2, C.4.3, C.4.5, C.4.6, F.4.1, F.4.2, F.4.3

### Grades 5 – 8

- Environmental Education: C.8.2
- Science: C.8.1, C.8.2, C.8.3, C.8.4, C.8.5, C.8.6, C.8.7, F.8.2

### Grades 9 – 12

- Science: C.12.1, C. 12.3, C.12.4, C.12.5, F.12.8

- 4. Complete preliminary observations.**
  - Map the test plots. If you have access to a digital camera, take overhead pictures showing the distribution of dandelions in the test plots.
  - Count the number of dandelions and/or measure the area that dandelions cover within the each plot. You may want to count mature plants and seedlings separately.
- 5. Ask a research question.** For example, “How can you remove all dandelions from your test plot without using chemicals or harming other vegetation?”
- 6. Develop hypotheses.** Remind students that a hypothesis is a guiding statement that is well defined and testable. Each pair of students should come up with an age-appropriate statement. For example, second graders might state, “If we dig all the dandelions out by the root, then the dandelions will die.” High schoolers might state, “If we remove the leaves from all dandelion plants, then the percent cover will be decreased by 50% after 3 weeks.”
- 7. Discuss variables.** As a class, brainstorm a list of variables for the experiments. Variables are anything that can affect the outcome of the experiment. There will be some variables that you can’t control in an outdoor setting (e.g., rain or drought, seasonal changes, and lawn treatments before the experiment began).
- 8. Design and begin the experiment.** As a class, set experiment start and end dates. Students should provide you with a detailed procedure and a materials list. Pending approval, they should assemble the materials and supplies for their experiment, conduct the experiment, and design a data collection process. With younger students, work together as a class to design and conduct the experiment. **Optional:** You may want to add a couple of test plots that demonstrate the use of chemicals designed to kill dandelions. Follow package directions and apply when students are not present.
- 9. Document the experiment.** Students should track the progress of their experiments. They should note observations, measurements, and changes they made to the procedures.
- 10. Measure success.** How do the test plots compare with the control plots? Did the number of dandelions decrease or increase in the test plots? How did the percent cover change from the start to finish?
- 11. Organize data and draw conclusions.** Were hypotheses supported or refuted? What factors influenced the outcomes? Were there any unexpected results? List sources of errors or variables that were overlooked. Compile data in tables and graphs.
- 12. Write lab reports and/or share results with class.**

# Assessing the Learning

Ask each student to write a lab report stating the hypothesis, procedure, data, results, and unanswered questions of the experiment. Younger students can share the results of their experiments orally with the class.

# Extending the Learning

**Write the Guinness Book of Dandelions.** Add a little competition to your investigation. Keep track of amazing dandelion records such as:

- Flowerhead with the largest number of seeds.
- Root with the greatest diameter.
- Longest root removed with a weed digger.
- Largest number of leaves for one plant.
- Longest single leaf.
- Longest flower stem.

**Grow dandelions!** Conduct an experiment for growing the largest or the most dandelions in a plot of lawn without using any chemicals. Encourage the students to “think in reverse.” They might try things like removing all other vegetation, disturbing the soil, planting dandelion seeds, or adding natural fertilizers.

**Play dandelion games.** Non-native plants are not all bad. Dandelions brighten the days of many people and can be used in these playful ways:

- Use dandelion flowers to make chains.
- Blow bubbles through the hollow flower stems.
- Eat dandelion leaves in salads. Be sure to try this before the plant flowers!
- Curl the ends of flower stems by splitting the sides of the stem and placing them in water.

## How to Kill a Dandelion

Possible ways to kill all the dandelions in the test plot with minimal disturbance to surrounding plants:

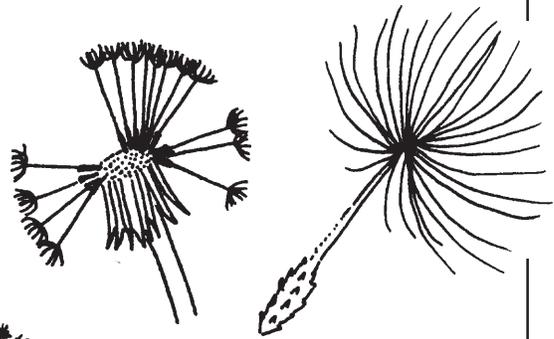
- Use weed diggers to remove dandelions and roots. Experimental design might include soaking the test plot with water before removing dandelions. This will soften the ground and make removal of more of the root possible. Possible complications: If part of the root remains, the dandelion will probably grow back.
- Sever the dandelion roots below the surface and remove the leaves and top of the root. Possible complications: If part of the root remains, the dandelion will probably grow back.
- Remove all the leaves from the dandelion. Put a small disk on top of the root to block sunlight. Possible complications: Energy stored in the root could still allow leaves to develop.
- Remove seedheads and do not allow the dandelion to reproduce. Problems: Dandelions are perennials. Since the energy stored in the root would need to be depleted, it could take a long time to kill a dandelion in this way.
- Kill the root with heat. Possible complications: Surrounding plants might also be damaged.

# Meet the Dandelion!

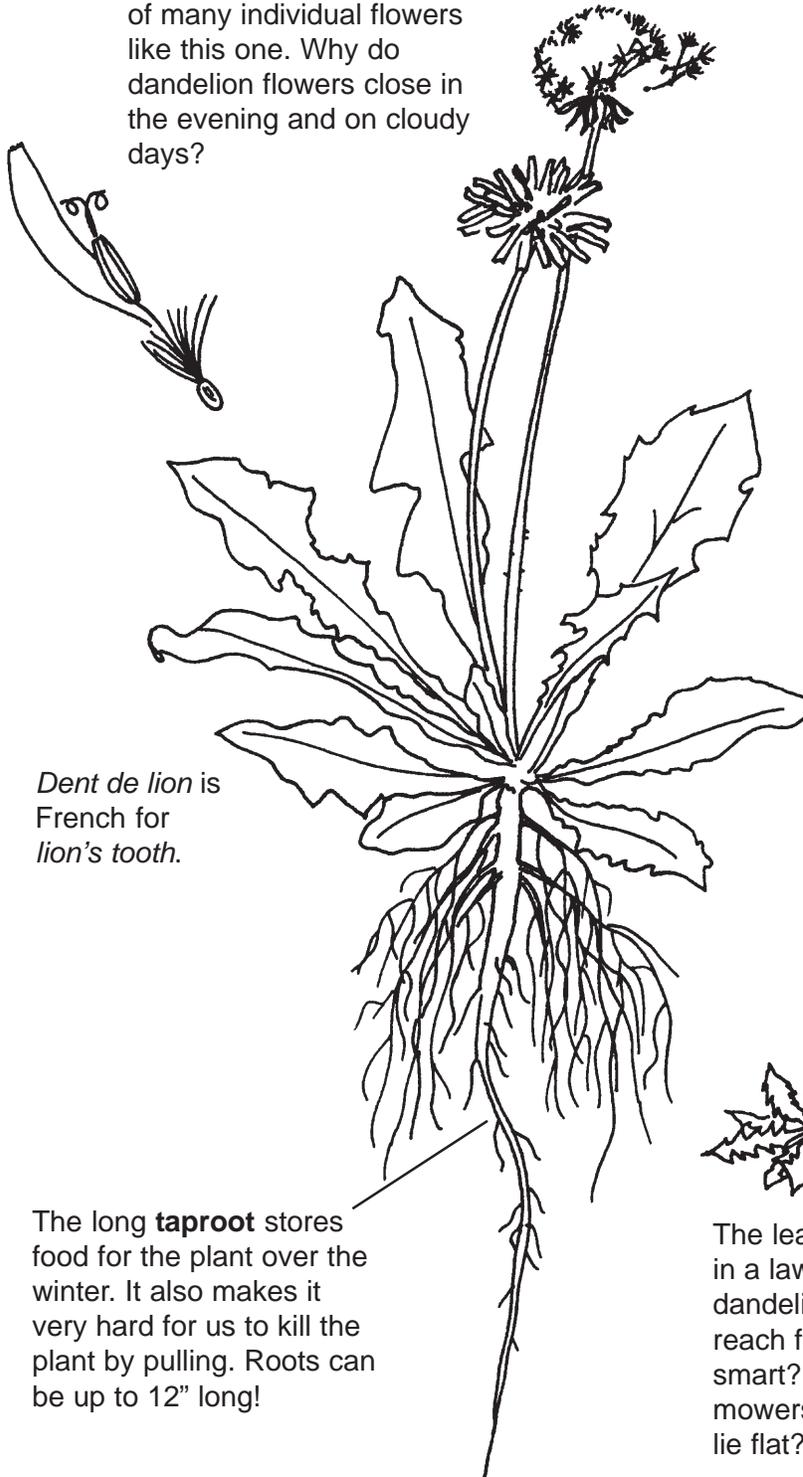
*Taraxacum officianale*

Dandelions are perennials. In fall, the leaves and flowers may die, but the root lives on underground.

The **flowerhead** is made up of many individual flowers like this one. Why do dandelion flowers close in the evening and on cloudy days?



**Seeds** are designed to fly far from the parent. How many seeds are there on each flower head?



*Dent de lion* is French for *lion's tooth*.

**Yum, yum!** Young dandelion leaves taste good in salads. You can scrape and boil the roots like potatoes. Some people even make wine from dandelion flowers!

The long **taproot** stores food for the plant over the winter. It also makes it very hard for us to kill the plant by pulling. Roots can be up to 12" long!



The leaves of dandelions growing in a lawn lie flat. The leaves of dandelions growing in tall grass reach for the sun. Are they smart? Do they "know" lawn mowers can't reach them if they lie flat?