
Seeds to Seedlings: Seed Collection

Activity Overview

Students collect seeds for their restoration and discover the potential of seeds by observing the relationship of plants and seeds to their surroundings.

Objectives

Students will:

- Explore the phenology of plant flowering times and seed maturation
- Use observation skills and plant identification skills
- Discover the many types of seeds and investigate seed ripeness and dispersal patterns
- Collect seed for use in future activities

Subjects Covered: Science and Math

Grades: K through 12

Activity Time: 30 minutes in the field; 30 minutes classroom discussion

Season: Late Spring, Summer, Fall, and early Winter

Materials: Paper bags, marking pens, gloves, notebook

State Standards

Science:

Discover how organisms meet their needs (F.4.1)

Investigate how organisms respond to internal/external cues (F.4.2)

Illustrate organisms' life stages (F.4.3)

Investigate structure & function of organisms (F.8.1)

Show organism's adaptations (F.8.2)

Explain reproduction (F.8.5)

Background

Restoring the land requires a source for seed and plant material. Seed from a local source can provide the following benefits: local plants are adapted to your local growing conditions, pollinators exist, and costs to restore an area are reduced. States and regions are divided into "Ecotype Regions," zones that are differentiated by microclimate and population barriers such as water, mountains, streams, etc. Your natural area may also have different microclimates where the same species exist under different conditions. The optimal collection site for seeds and plants is as close as possible to your receiving site, the area you hope to restore.

There are specific guidelines for collecting seeds so that enough seed remains on the plants for wildlife and future plant populations. These guidelines are a part of a seed collecting code of ethics. The following guidelines ensure continued survival of species and established biosystems.

- Collect only 10% of the harvestable seed of those species which are uncommon or depend solely on seed for reproduction (annuals and biennials).
- Most species may be harvested at a 25% rate and a few widespread and common species may be collected at 50% of the harvestable seed. Never collect above the 50% rate.
- Walk lightly to avoid trampling plants during the growing season.
- If collecting from gardens or restorations, check the source of plant material.
- Realize when collecting seed you are disrupting interactions between plants and animals.
- Avoid collecting protected species. Leave that to the experts to ensure proper collection, storage and propagation.
- State and federally listed species can only be collected with a permit.

The goal is to collect seed at full maturity, and therefore to ensure the greatest percentage of viability. There are two stages of seed development: the soft dough stage and the hard dough stage. The seed is in the soft dough stage if, when squeezed between the thumb and forefinger, the seed interior is ejected as a doughy substance. Seeds often are green or light-colored. Soft dough seed tends not to be viable. Seeds in the hard dough stage are brown or dark-colored and easily shatter. The hard dough stage can be determined by a bite test. Simply put, if the seed is too hard to bite, it may be considered mature and has, in all probability, achieved dormancy. Dormancy is a condition of the seed in which germination is prevented by internal mechanisms. These mechanisms may be either physical or chemical in nature and help protect the future seedling from germinating at a time which may be detrimental to its survival, such as late in the fall. Generally, seeds mature

Seeds to Seedlings: Seed Collection (cont.)

Show organism's place in ecosystems (F.8.8)

Explain survival and population growth of species (F.8.9)

Understand evolution theory, natural selection, biological classification (F.12.5)

Understand species changes & diversity (F.12.6)

Infer changes in ecosystems (F.12.8)

Math:

Use reasoning abilities (A.4.1, A.8.1, A.12.1)

Communicate mathematical ideas (A.4.2), logical arguments (A.8.2, A.12.2)

approximately one month after flowering. Lists with possible seed collection dates are often available through the Department of Natural Resources, nature centers and universities.

Activity Description

Go out in the natural or restored area and locate both flowering plants and plants with seeds. Collect when humidity is low and no rain or dew is present. Students can pair up with a paper bag, pen and notebook; each group should choose different species.

STEPS:

1. Make a list of plant attributes and/or draw plant in notebook.
2. Identify plant using a key or identification book.
3. Write plant name, date, location, and student names on the paper bag.
4. Compare ripe to unripe seeds.
5. Hold seed stalk (panicle) over paper bag and drag hand over panicle or stalk to allow seeds to drop into bag. You can also collect them in your hand and place them into the bag. Remember: any seeds that drop on the ground are good for the natural area.
6. Compare different types of seeds, for example, those with "wings" and with those that are sticky. Discuss how different seeds types are dispersed.
7. Tape or glue a sample of each seed type into notebook.
8. Weigh seeds and write amounts onto the paper bags.
9. Place bags in cool, dry area in order to dry.

Questions for discussion

When collecting seed, what would happen if we removed all the seed of a particular species? What would happen if we left seed behind and did not collect it?

How we choose to collect influences the natural area we take seed from. Why would it be important to let seed remain on each plant?

How is diversity influenced if we leave half of the seed on each plant in the natural area?

Extensions

- Chart flowering and seed maturity times of specific plants for comparisons (grasses, forbs, legumes).
- Compare the flowering time on the UW-Madison Web site (below) to the actual flowering time of plants in your natural area.
- Count out 100 seeds of each species you collected and then weigh them to compare weight differences among species.

Seeds to Seedlings: Seed Collection (cont.)

- Keep a nature journal that includes drawings and phenology records.
- Explore many ecotype regions and note the differences between ecotypes and genotypes.
- Investigate genetic diversity and population genetics.

Additional Resources

- Jackson, Laura. (1997). *Prairie Seedlings Illustrated: an identification guide*. University of Northern Iowa.
- Packard, S., Mutel, C., (Eds.) (1997). *The tallgrass restoration handbook: For prairies, savannas and woodlands*. Washington, D.C.: Island Press.
- Riveredge Nature Center. (1999). *Begin with a seed: The riveredge guide to growing Wisconsin prairie plants*. Wauwatosa, WI: Wonder Cat Graphics.

Web sites

- Seedling ID Guide for Native Prairie Plants <http://mdc.mo.gov/grownative/plantID/>
- University of Wisconsin Herbarium, www.botany.wisc.edu/wisflora/blooming
- Weed seedling Identification: <http://www.weeds.iastate.edu/weed-id/weedid.htm>

Assessments

- From your experience, describe how you can identify if a seed is ripe and ready for collecting.
- Describe different seed dispersal methods you observed while collecting seed. What are the advantages to the different types of dispersal mechanisms?
- What would happen if all seed was collected from a site?
- What are the benefits of collecting seed from a local seed source?