

CLEAVERS

Cleavers is a seasoned traveler. Few plants have so effectively moved across continents, thriving where they land. Velcro-like hairs on leaves and seeds make it perfectly adapted to hitching rides on fur or clothes. As medicine, cleavers assists our bodies' internal movement by cooling inflammation and clearing obstacles that inhibit the smooth flow of lymph, blood, and urine.



Other Names: *Galium aparine*, Our Lady's bedstraw, goose grass, speb'kocidac (Lushootseed)

Identifying Cleavers: There are 250 species of *Galium* throughout the world, with 75 species in North America, and approximately 13 in the Pacific Northwest. *Galium aparine* is most abundant in our region. Leaves have a pointed tip and are clustered in whorls of six to eight around square stems. Tiny whitish-green flowers have four petals that are fused at the base. Fruits ripen into two-lobed green nutlets that become brown when they mature. They readily stick to cloth or fur.

Cleavers does not have a strong stem of its own, so it relies on other plants to hold itself up. The species name "aparine" comes from the Greek word for "to seize," because cleavers has reversed hairs on the leaf margins and stems that help it move toward the sun. If a lattice is not available for climbing, cleavers forms lush mats on the ground.

Other *Galium* species, including fragrant bedstraw (*G. odoratum*) and sweet woodruff (*G. triflorum*) are high in compounds called coumarins, which are odorless when fresh, but release a pleasant vanilla-like fragrance when wilted or dried. These two species are shorter growing, and have less barbed hairs than cleavers. *Galium* species are in the Madder or Rubiaceae family.

Where it Grows: Cleavers thrive in wet environments with decent soil such as fields, forest floors, gardens, and back alleys. It grows from low coastal areas up into the mountains at 10,000 feet.

Season: The whole plant is harvested for juice or medicine in early spring before it goes to seed. Cleavers gets fibrous and less juicy as it matures.

How to Harvest: Cut the lush green growth with scissors or simply pull a clump up from the ground. The plant material will stick together. Roots are miniscule and can be included when making juice or medicine.

Eating Cleavers: It is no accident that some of our most nutritious wild greens are heavily armed. Take nettles for example: if they did not protect themselves with their ability to sting, forest creatures and people would devour them. Cleavers is rich in chlorophyll and minerals including silica, but it is covered in hairs that discourage foraging. All grazing animals eat it, but they have to chew it for a long time. If you attempt to eat fully developed fresh cleavers, it will stick to the back of your throat and induce a fit of coughing. Cooking or juicing solves this dilemma. In Europe, cleavers has been added to soups, sautés, and other cooked dishes for centuries.

Spring cleavers can be pressed into a deep green juice that is reminiscent of wheat grass. For instant gratification, harvest a large handful, mash it with your hands, and squeeze it to get the juice out. You can also make cleavers juice by chopping up the herb and adding it to a blender with a little water, then straining out the plant debris by squeezing the herb through muslin cloth or a fine strainer. For a delicious and revitalizing spring green drink, mix this concentrate with 2-3 parts water, some fresh squeezed lemon juice, and a little honey or maple syrup as sweetener. Drink ½-1 cup at a time and keep the rest in the refrigerator for up to 3 days, or freeze it in ice cube trays for later use.



Cleavers Medicine: Like nettles, salmonberry sprouts, and other spring greens, cleavers is valued for helping our body to clear the debris of winter and energize us during the spring season. Cleavers has also been used to reduce heat, swelling, and stagnation in people's lymph, blood, and urine since ancient times. Our lymph system is an unseen watery network of vessels and glands running throughout our body. Lymph nodes are full of white blood cells that fight infection and clear debris from lymph fluid. You may notice when these swell in your neck in response to infection, but lymph tissue is always at work. Herbalists use cleavers internally as juice, tea or tincture to promote health lymph function.

Cleavers support our kidneys in eliminating waste products and excess fluid. All species of cleavers contain asperuloside – a compound that is anti-inflammatory and a mild laxative. Cleavers also contains tannins, which tighten inflamed tissue, and coumarins, which are known to strengthen cardiovascular structure including varicose veins. These many functions make cleavers a valued medicine for many conditions. They are not recommended for people who are taking blood thinners or when a diuretic is contraindicated.

Cleavers is used topically as a poultice or tea compress to ease minor burns and skin irritations. To make a poultice, gather a handful of young cleavers and mash it with your hands until the juice begins to come out and the herb no longer feels sticky. Place the herb over the skin and secure it with a band-aid or cloth.

Traditional Technologies: In Scandinavia, cleavers herb was used in dairy production as a sieve to filter milk, and as a coagulating substitute for cheese making.

Ecological Relationships: Cleavers is called goose grass because ducks, geese, and other herbivores eat it. Deer and other large mammals often use cleavers patches as a bed.

Resources

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Moore, Michael. *Medicinal Plants of the Pacific West*. Red Crane Books, 1993.

Schofield, Janice. *Discovering Wild Plants*. Alaska Northwest Books, 1989.

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Kuhnlein, Harriet V., and Nancy J. Turner. *Traditional Plant Foods of Canadian Indigenous Peoples: Nutrition, Botany and Use*. Philadelphia: Gordon and Breach, 1991.

CLEAVERS: CATCHING HITCHHIKERS

Time: 45 minutes to 1 hour
Season: Summer or Fall
Age: Grades K–12
Setting: Outdoor



Overview: In this activity students “catch” seeds on a cloth and investigate methods plants use to disperse seeds.

Student Wondering: *How do cleavers seeds move themselves to new places where they can grow?*

Learning Objectives	
Understandings <i>Student will understand that...</i> <ul style="list-style-type: none">seed shape and texture contributes to plant dispersal.	Knowledge and Skills <i>Student will be able to...</i> <ul style="list-style-type: none">identify three structural characteristics of seeds that help them to spread.

NGS Standards: Performance Expectations		
<ul style="list-style-type: none">2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.		
Scientific and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<ul style="list-style-type: none">Developing and Using Models	<ul style="list-style-type: none">LS2.A: Interdependent Relationships in EcosystemsETS1.B: Developing Possible Solutions	<ul style="list-style-type: none">Structure and Function

Vocabulary: seed dispersal, adaptation

Background: Cleavers is a common weed in gardens, city lots, and forests. It does not have a strong stem of its own, so it relies on other plants to hold itself up. The species name “aparine” comes from the Greek word for “to seize,” because cleavers has reversed hairs on the leaf margins and stems that help it move toward the sun. Cleavers seeds are also covered in hairs that catch onto clothes, fur, and even skin. In this lesson, students explore how the structure of cleavers and other plant seeds helps them to catch rides to new places where they can grow. You may need to define the word “hitchhiker.”

Materials:

- Strips of coarse cloth that will catch seeds (terry cloth, loose wool, cotton), or socks made from coarse fabric that will pick up seeds like wool or cotton
- Hand lenses or magnifying glasses
- Samples of cleavers plant for students to pass around or for each table

For planting seeds:

- Milk cartons split lengthwise
- 4 inch pots, or plastic cups with holes poked in the bottom
- Potting soil
- Watering can

OPTIONAL: bring samples of seeds that disperse by other means. See activity for examples.

Preparation: Find a place in the schoolyard or nearby field where students can catch seeds including cleavers on cloth.

LESSON: CLEAVERS - CATCHING HITCHHIKERS

INTRO

10 MINUTES

Share: Like all species, plants are designed to reproduce, or create the next generation. They do this by making seeds that grow into new plants. But if the seeds simply drop straight to the ground, there is not enough space right beneath the mother plant for the baby to grow to its full size. That would be like you trying to grow up in a crib! *How do plants solve this dilemma?* They make seeds that can travel!

Ask: *How do seeds spread to new places to grow new plants?*

Share: Seeds move in many ways. This is called **seed dispersal**. Examples include:

- Getting carried in the wind (cottonwood or willow fluff, conifer seeds that fly from cones, big leaf maple seeds fly like helicopters)
- Making sweet bright colored fruit that animals eat and then disperse (hawthorn, rose, berries)
- Floating on the water (coconut)
- Making barbs that hook on animal fur or cloth (burdock, cleavers)

CATCHING HITCHHIKERS

10 MINUTES

Give each student or each small group of students a strip of cloth. Lead them to an area with plants that are in seed. Using their strip of cloth, encourage students to find as many varieties of hitchhiker seeds as possible. Ask them to lay the strips of cloth over a variety of plants with some light pressure. Another option is to put socks over their feet, and walk through the area with plants, gathering a variety of "hitchhikers."

Investigation: After the walk, have students sit down and look closely at their cloth. Pass out hand lenses or magnifying glasses. **Ask:** *What do you notice about the seeds? How do they stick to your cloth? Can you identify*

any of them? Ask students to draw their seeds in a field book or on a piece of paper. If you are planting the seeds, have students match up seed types in bowls. It is not necessary to know all seed types collected. There is value in not revealing answers to students right away - allow them to grow and investigate their hitchhikers with the spirit of inquiry.

OPTIONAL – Plant your mystery seeds: Have students fill the same number of pots as there are types of seeds $\frac{3}{4}$ full with potting soil. Place 5–10 seeds of one type in each pot, and place a drawing of the seed on or near the pot so you will know what it looks like. Sprinkle a little potting soil over the seeds, then water the pots and keep the soil moist until the seeds sprout. Once the plants are large enough, identify them. If possible, find these plants in the garden or schoolyard.

A Close Look at Cleavers: Pass out samples of cleavers so students can take a close look at the hairs on the stems and the seeds. Have them feel their stickiness, and notice the direction of the tiny hairs or barbs.

Share: Cleavers lives close to the ground. It does not have strong woody stems to help it grow tall and find light, but it does have tiny barbed hairs that help it grab onto plants and other objects and grow upward. When you are a plant growing on a shady forest floor, this is an important **adaptation** for survival. Taller plants are also more likely to get sunlight, thrive, and then disperse seeds to make a new generation.

Share: People have always learned from observing nature, including plants. *Think about those tiny barbed hooks on cleavers. Does it remind you of anything we use? Think of tools or everyday items that make our lives easier.* A Swiss man developed Velcro after closely looking at burrs that clung to him and his dog on a hike. When he looked at the seeds under a microscope, he replicated this “hook and loop” design with fabric to develop Velcro - one of our most useful and common fasteners.

Ask: *Do the shapes of other seeds remind you of anything that might be useful?* Examples might include a big leaf maple seed that moves through the air like a helicopter. A dandelion seed catches the wind like a parachute. A rosehip makes a delicious bright red fruit that attracts hungry animals. These animals carry the seeds, break down the seed coat, and make it easier for the seeds to start growing into new plants.

TYING IT TOGETHER

10 MINUTES

Share: Over millions of years, seeds have developed ingenious ways to travel to new places. People have carefully observed seed dispersal and have applied it to their own technologies. As you see plants going to seed, try to figure out how the seeds get dispersed. *What can we learn from seeds?*

Closing Question: *If you could be any type of seed, what would you be? What would your seed superpower be?*

DIGGING DEEPER

Grades 7-12: Ask students if they see any variation among the same types of seeds. Ask why that might be. This is a possible place to introduce different genotypes and the importance of genetic diversity for plant survival.

This lesson was adapted from Catching Hitchhikers in *Sowing the Seeds of Wonder: Discovering the Garden in Early Childhood Education* by Life Lab.

See Christy Peterson (2013) [Seeds on the Move: Seed Dispersal for Kids](#). Kids Discover.
Accessed June 3, 2017

CLEAVERS GREEN JUICE

Time: 30 minutes
Season: Spring
Age: Grades K–12
Setting: Indoor or Outdoor



Overview: In this activity students learn how to identify cleavers and its traditional uses as food and medicine. Students sample cleavers juice.

Student Wondering: *What is cleavers, and how can it improve my health?*

Learning Objectives	
<p>Understandings <i>Student will understand that...</i></p> <ul style="list-style-type: none"> chlorophyll-rich plant juices including cleavers are beneficial for our health. 	<p>Knowledge and Skills <i>Student will be able to...</i></p> <ul style="list-style-type: none"> identify cleavers. press juice from young cleavers plants. name one medicinal use of cleavers.

NGS Standards: Performance Expectations		
<ul style="list-style-type: none"> MS-LS1-6. Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. 		
Scientific and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<ul style="list-style-type: none"> Constructing Explanations and Designing Solutions 	<ul style="list-style-type: none"> LS1.C: Organization for Matter and Energy Flow in Organisms PS3.D: Energy in Chemical Processes and Everyday Life 	<ul style="list-style-type: none"> Energy and Matter

Vocabulary: photosynthesis, carbon dioxide, stomata, oxygen, chlorophyll

Background: Cleavers do not seem edible because they are covered in sticky hairs, yet they are one of the oldest documented herbal remedies. If you massage and squeeze the young plants, you can express a fair bit of juice by hand - a trick that will impress young people and adults alike. It is similar in look and flavor to wheat grass juice, and is rich in nutrients including chlorophyll, calcium, potassium, and chloride. Cleavers is used medicinally to support healthy lymph flow.

Materials: Freshly harvested spring cleavers. A blender, water, small paper cups, and additional ingredients for making the juice of your choice (see recipe).

Preparation: Review the *Cleavers Overview*. Gather a large amount of young cleavers herb for making juice. Harvest from a clean area and try to gather plants that are not covered in leaves or other material as they are difficult to separate from the sticky stems.

LESSON: CLEAVERS JUICE

INTRO

10 MINUTES

Begin by showing students samples of cleavers plants. Encourage them to touch the samples and notice how the stems stick to their skin and clothes. **Ask:** *How does cleavers stick to you?* Have students observe the tiny hairs pointing downward along the plant. Notice that it does not have strong stems for growing tall, but it can use plants and trees around it as a trellis for climbing. This helps the plant get more sunlight and grow bigger. When you are a plant growing on a shady forest floor, this is an important adaptation for survival.

Ask: *Do you know what cleavers and other plants need to survive besides sunlight?* Answers include air, water, and nutrients. Plants also need space and optimal temperatures to thrive.

Photosynthesis and Chlorophyll: This is an opportunity to either review the basics of **photosynthesis** or introduce the concept. Choose knowledge that fits your students' knowledge level. One option is to show a video clip on photosynthesis. An introduction or review video clip on photosynthesis can be found on Crash Course Kids at Vegetation Transformation: Crash Course Kids #5.2 <https://www.youtube.com/watch?v=EstPeBt9CyU>

Share: All plants need to eat and drink just like we do. While we need to travel around to get our food, plants can make their food right where they are. Their food is in the form of sugars. They do this by gathering sunlight in their leaves, water from their roots in the ground and **carbon dioxide** from the air. Carbon dioxide is a gas that plants breathe in through openings in their leaves called **stomata**. Plants transform these basic ingredients: sunlight, water, and carbon dioxide into food and **oxygen**. Oxygen is released from plants and helps to keep us and the planet healthy. This process is called photosynthesis. "Photo" means sunlight and "synthesis" means mixing. **Chlorophyll** is the green pigment inside plant cells called chloroplasts that makes this possible. It is interesting that we breathe out carbon dioxide and breathe in oxygen, while plants breathe in carbon dioxide and breathe out oxygen. We are supporting each other!

When we eat green plants, we are taking in the fibrous structure, food, minerals, vitamins, and fats that plants use to keep themselves strong and healthy. Many of these compounds including chlorophyll will also come out when the plant is juiced.

CLEAVERS JUICE DEMONSTRATION

5-10 MINUTES

Gather a good sized clump of cleavers – maybe the equivalent of 4 cups when pressed together. Mash it until it

becomes soft and deep green. Squeeze it into your hand or into a cup to extract the juice. Allow students to do the same or to taste a few drops that you have pressed in their hand. The flavor will be strong like wheatgrass and intensely green.

Share: Cleavers juice is so green because it contains chlorophyll, which is rich in vitamins A, C, E, and K. Chlorophyll helps us to stay healthy and strong. (Choose medicinal benefits from the cleavers overview that fit the knowledge level of your students. You may want to share that cleavers have been used for centuries to clear infections, especially when people get swollen lymph glands).

Make Juice: Harvest enough cleavers to make a green juice for students to try. You can make a simple version by chopping up the herb and adding it to a blender. Cover it with water, blend well, then strain out the plant debris by squeezing the herb through muslin cloth or a fine strainer. Mix this concentrate with equal parts water, some fresh squeezed lemon juice, and a little honey or maple syrup as sweetener. Have students try a small Dixie cup of the drink. Or you can make this delicious juice from Charlene Koutchak:

Charlene's Cleavers Juice

Affectionately known as sticky weed by children, this early springtime recipe is a huge hit with my two boys. People tell me that drinking this juice gives them a boost and a positive shift in their mood.

- 2 ½ cups chopped fresh cleavers
- About 7 cups of water
- ½ cup honey
- 1/3 cup freshly squeezed lemon juice (2 lemons)
- 1 cup pineapple
- ½ banana
- pinch of salt

Gather cleavers when it is young and juicy (preferably before flowering), roughly chop, and then add to a blender with about a cup of water. Blend until it turns to a pulpy puree. Strain the plant matter from the juice into a large measuring cup and add enough water to bring the total volume to 8 cups. Rinse the blender and pour the juice back into it. You may need to divide it up to make room in your blender for all the other delicious additions. Next, gently warm the honey and lemon juice, then add it to the blender along with the pineapple (fresh is recommended but canned will work just fine), banana, and salt. Blend well. Drizzle in more honey as needed. I like to chill this delicious springtime tonic before we enjoy it.

TYING IT TOGETHER

5 MINUTES

Ask: *What stuck with you today when learning about cleavers?*

DIGGING DEEPER

Song on photosynthesis for K-3: <https://www.youtube.com/watch?v=xuivYRmlACM>

Make cleavers headbands, bracelets, or badges.