



BURKE FROM HOME

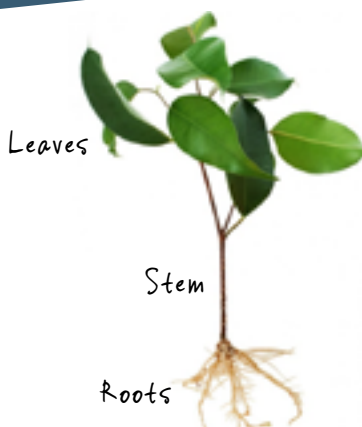
PLANT EDITION

GRADES: ALL AGES! BEST FOR GRADES 2-8

WHAT'S INCLUDED:

- Learn how plants have adapted to survive in many different environments.
- Meet plants with amazing adaptations and solve puzzles about them.
- Get to know the plants in your neighborhood and start your own research collection!

PLANTS ARE LIVING



Can you think of a plant you've seen before? How are plants different from other living things?

Plants come in many shapes and sizes.

Regardless of size, most plants have leaves, a stem, and roots.

Plants produce their own energy.

Plants use their leaves to collect energy from the sun to produce their own food. This process is called **photosynthesis**.

PLANTS ARE EVERYWHERE

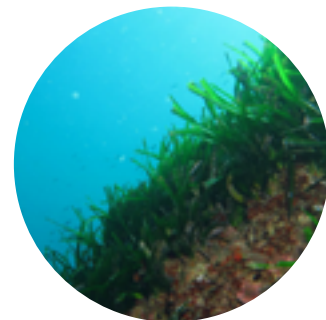
Over 400,000 plant species grow on Earth. Plants can grow in almost every kind of environment you can imagine!



Dry desert areas



Tall mountain tops



Cold ocean waters

HOW DO PLANTS DO IT?

Like all living things, plants have to do three things to survive:

**FIND
NUTRIENTS**

**PROTECT
THEMSELVES**

REPRODUCE

Each plant species has unique traits and characteristics that help them to accomplish these three survival goals. These special qualities are called **adaptations**. Adaptations help plants to grow and survive in many different types of environments.

AMAZING ADAPTATIONS

What similarities and differences do you notice in the adaptation photos below?
Have you ever seen a plant near your home that uses a similar strategy for survival?

FIND NUTRIENTS AND ENERGY



A thimbleberry's large leaves have more surface area for collecting sunlight.



Mosses grow on other plants to access sunlight.



A broadleaf stonecrop has thick waxy leaves, which help it to conserve water in hot, dry areas.



Some plants have more unusual strategies: Pitcher plants attract and then digest insects that crawl inside.

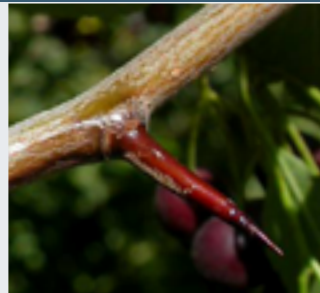
PROTECT THEMSELVES



The leaves and stems of the stinging nettle are covered with acid-filled hairs, discouraging grazing animals.



A Douglas-fir has thick bark to protect it from wildfires.

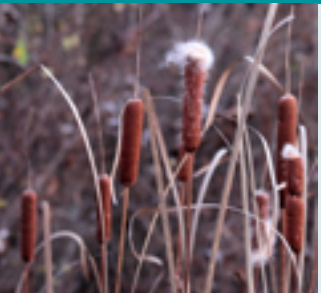


Hawthorn plants have thorns that discourage predators.



When attacked by insects, sagebrush releases a chemical to warn neighboring plants of the danger.

REPRODUCE AND DISPERSE



Cattails produce fluffy seeds which float in wind or on water.



Pine cones protect hundreds of seeds until the right time comes to release the seeds.



Blackberry plants produce fruit to attract animals. Animals eat the fruit then spread the seeds through their poop!



The flower of the giant Dutchman's pipe smells like rotting meat to attract flies as pollinators!

PLANT SENSES

Even though plants have no ears, eyes or brain, they can still sense their environment and respond to it. Botanists who study plants have labeled 15 different tropisms, or plant senses!



Heliotropism:

Sunflowers rotate to face the changing position of the sun.



Hydrotropism:

These mangrove roots sense and grow toward a water source.



Thermotropism:

Rhododendrons curl and droop their leaves to protect them from freezing temperatures.

WHAT DOES IT MEAN?

The names of these tropisms are based on Greek words.

“helio” = sun

“hydro” = water

“thermo” = heat

ENVIRONMENT MATTERS

A species' adaptations help it to survive in a specific environment.



What traits help a cactus to survive in a desert?

What traits help a fern to survive in a rainforest?

What challenges would these plants face if you swapped their environments?

GET CREATIVE!

Now that you've learned of the adaptations that plants can use to survive (and thrive!) in their environments, it's your turn! Design a plant that would survive and thrive.

FIRST, CHOOSE AN ENVIRONMENT:

Adaptations help a plant to thrive in its specific environment. Where will your plant grow?

- **DESERT (DRY & HOT)**
- **TEMPERATE (DARK, WET, & COOL)**
- **TROPICAL (WARM, WET, & SUNNY)**

NEXT, DRAW YOUR PLANT!

Use the box below to sketch your plant. Make sure your plant has...

- Roots
- Stem
- Leaves

CHALLENGE YOURSELF

Make sure to draw or describe how your plant will...

- Find nutrients and energy
- Protect itself
- Reproduce and disperse

PLANT NAME:

PLANT INFO CARDS

Great work imagining a new plant! Now it's time to take a closer look at more plants with amazing adaptations.

THINGS TO THINK ABOUT WHILE YOU'RE READING:

- How does each plant species survive in its environment?
- What other plants or living things could you find in that environment?
- Could you survive in that environment? What would you need in order to survive?

WASHINGTON
LOCALS

Many of these plants are native to Washington state! Look for the map icon on the cards below.



LODGEPOLE PINE

Pinus contorta var. latifolia



ENVIRONMENT:

Dry, mountainous areas

ADAPTATIONS:

- **Cones sealed with pitch** protect seeds stored inside for years.
- **Wildfires release the seeds.** High temperatures from fires melt the pitch so cones open and release seeds.



BIG-LEAF MAPLE

Acer macrophyllum



ENVIRONMENT:

Wet, shady forests at low and middle elevations

ADAPTATIONS:

- **Huge leaves** capture sunlight in dense forests.
- **Drops its leaves** in winter to conserve energy
- **Winged seeds** travel long distances in the wind.

CALIFORINA FUCHSIA

Zauschneria californica



ENVIRONMENT:

Dry mountain slopes and shrublands

ADAPTATIONS:

- **Tiny silvery leaves** reduce water loss, allowing better growth in hot, dry areas.
- **Bright red tube-shaped flowers** attract hummingbirds to drink nectar and pollinate other fuchsia flowers.



PONDEROSA PINE

Pinus ponderosa



ENVIRONMENT:

Dry, warm forests at low to middle elevations

ADAPTATIONS:

- **Thick bark** protects the tree from wildfires.
- **Sheds its lower branches** as it grows to protect itself from fires on the forest floor.

COCONUT PALM

Cocos nucifera



ENVIRONMENT:

Tropical shorelines with lots of humidity, sun, and sandy soil

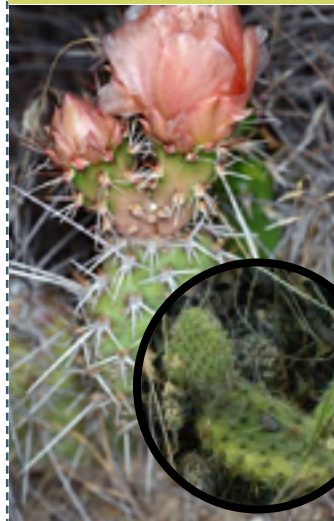
ADAPTATIONS:

- The coconut's **thick external husk** protects the seed inside from predators and saltwater.
- **Coconuts float** to new shores, where the seeds grow into trees.



PRICKLY PEAR CACTUS

Opuntia columbiana



ENVIRONMENT:

Dry desert areas

ADAPTATIONS:

- **Wide flat stems (or pads)** store water.
- **Sharp spines** protect from thirsty animals seeking the water stored in its stems.
- **Pads can break off**, develop roots and grow into a new plant.



WESTERN RED CEDAR

Thuja plicata



ENVIRONMENT:

Wet or swampy areas

ADAPTATIONS:

- **Many small leaves** capture sunlight, even in shady places.
- **A natural fungicide** protects the bark and wood from rotting.
- **Seed cones** hold winged seeds that can travel in the wind.



PACIFIC WILLOW

Salix lasiandra



ENVIRONMENT:

Wetlands like riverbanks and floodplains

ADAPTATIONS:

- **Light, cotton-like seeds** spread in the wind or on water.
- **Quick-growing roots** can detect moisture and vibrations and grow toward potential water sources like streams or pipes.

DRACULA ORCHID

Dracula bella



ENVIRONMENT:

Shady tropical rainforests at high elevations

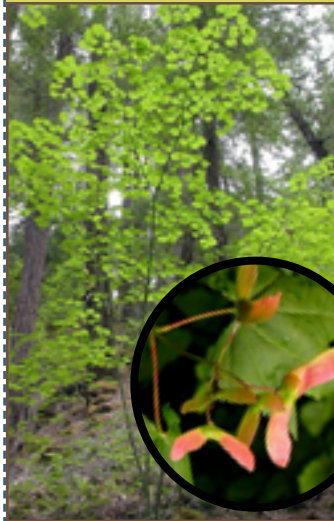
ADAPTATIONS:

- **Grows on other plants**, like trees, to reach the right amount of sunlight.
- **Mimics a mushroom** to attract pollinator flies. The flower's petals look and smell like fungi.



VINE MAPLE

Acer circinatum



ENVIRONMENT:

Wet, shaded areas in forests

ADAPTATIONS:

- **Winged seeds** fly up to 330 feet in wind.
- **Flexible branches** protect the trees from avalanches in mountains.
- **Plants spread** when branches bend down to the ground and make new roots and stems.

SO YOU THINK YOU CAN MATCH...

Draw a line between the plant and the adaptation that each plant uses to help it survive!



DRACULA ORCHID



WESTERN RED CEDAR



VINE MAPLE



CALIFORNIA FUSCHIA



BIG LEAF MAPLE

1. Stores water inside its wide, flat stems

2. Grows on the trunk or branches of a tree to collect sunlight

3. Flexible branches to withstand windstorms and snow

4. Strong external husk protects the seeds

5. Seeds spread by wind or water



PONDEROSA PINE



LOGEPOLE PINE



PRICKLY PEAR CACTUS



PACIFIC WILLOW



COCONUT PALM

PLANT EXPERT CHALLENGE

How does each adaptation help the plant to survive? Next to each clue, draw these shapes to indicate whether the adaptation helps with...

● FINDING NUTRIENTS

■ PROTECTION

▲ REPRODUCTION

ANSWER KEY

1. Prickly pear cactus 2. Dracula orchid 3. Vine maple 4. Coconut palm 5. Pacific willow

I KNOW YOU ARE, BUT WHO AM I?

Three mystery plants from our info cards have left you some clues. Can you solve these plant riddles and figure out which plant is which? Solve the riddles yourself, or quiz someone else in your home!

MYSTERY PLANT 1

Clue 1

I live in wet, shady forests.

Clue 2

I have huge green leaves that I use to capture as much sunlight (energy) as possible.

Clue 3

Every fall, I shed my leaves. I grow new ones in the spring.

Who am I?

MYSTERY PLANT 3

Clue 1

I live in a dry, hot environment. My tiny silver leaves help me retain water in the bright sun.

Clue 2

To help me reproduce, I grow many bright red tube-shaped flowers with nectar to attract hummingbirds.

Who am I?

MYSTERY PLANT 2

Clue 1

I grow in dry forests where there are often wildfires.

Clue 2

I protect myself from the fires in two ways: I surround my trunk with thick bark, and I shed my lower branches to stay safe from fires on the forest floor.

Who am I?

BRANCH OUT BONUS!

Write your own set of clues about another plant and read it to a friend or family member.

Can they guess which plant you are?

MYSTERY PLANT 4

Clue 1:

Clue 2:

Clue 3:

Who am I?

ANSWER KEY

1. Big leaf maple 2. Ponderosa pine 3. California fuchsia

A WALK IN THE PARK

Can you find plants with these adaptations in your own neighborhood? Take this page outside on a scavenger hunt. Or, search through our [virtual native plant gardens](#) or [Herbarium image gallery](#) at the Burke Museum!

A PLANT WITH MANY TINY LEAVES TO CAPTURE SUNLIGHT	A TREE WITH THICK BARK TO PROTECT ITSELF	A PLANT THAT USES BRIGHT COLORFUL FLOWERS TO ATTRACT POLLINATORS
A PLANT THAT USES SHARP THORNS OR SPIKES TO PROTECT ITSELF	A PLANT THAT GROWS ON THE TRUNK OR BRANCHES OF A TREE TO REACH AND COLLECT SUNLIGHT	A PLANT WITH FLEXIBLE BRANCHES TO WITHSTAND WINDSTORMS AND SNOW
A TREE WITH CONES THAT HOLD AND PROTECT MANY SEEDS	A PLANT WHOSE FLOWERS USE A SCENT OR SMELL TO ATTRACT POLLINATORS	A PLANT WITH LARGE, FLAT LEAVES TO CAPTURE SUNLIGHT

PLANT EXPERT CHALLENGE

Already found each of the plants described above? Consider tackling one (or all) of these additional plant challenges!

FLOWERS

Draw a favorite flower here.
How do you think this flower helps its plant to survive?

GET CREATIVE

Can you find a leaf that looks like a face? Or an animal? Draw it here!

EDIBLE PLANTS

Find a plant that is edible for humans (don't eat; just identify!).
Draw or write about the part of the plant that humans eat.



START A PLANT COLLECTION

Now that you’ve spent time observing and appreciating your neighborhood plants, let’s branch out further. We can learn more about plants by starting a dried plant collection! It’s important to do this carefully and respectfully.

STEP 1: COLLECT

MATERIALS FOR COLLECTING:

- Plastic bag or rigid container
- Scissors
- Pen or pencil
- Notebook or piece of paper
- An adult

ETHICS OF COLLECTING

Only collect from your yard, or another place where you’ve received permission.

Follow the 1 in 20 rule—only take a sample if you can see 20 good plants of the same kind.

Be careful not to trample or damage any nearby plants!

Unsure what to collect? Look for a leaf or flower that has fallen off the plant naturally!



COLLECTION STEPS:

1. Review the ethics of collecting before you start.
2. Head outside—find a plant you’d like to study.
3. Record observations about your plant. Be sure to include:
 - Date and location
 - Description of the plant —are there flowers? What colors?
 - A sketch of your plant!
4. Use your scissors to carefully remove a leaf or flower from the plant and place it in your container. Be careful not to damage the rest of the plant (see above).



STEP 2: PRESS

MATERIALS FOR PRESSING:

- Collected plant specimen
- Newspaper
- 2 pieces of flat cardboard
- Heavy books

PRESSING STEPS:

1. Place your collected leaf or flower flat on a piece of newspaper.
2. Fold the newspaper over the specimen so that it lays as flat as possible.
3. Sandwich the newspaper between 2 pieces of cardboard (this adds stability and air flow) - careful not to move the specimens!
4. Stack books (or other heavy objects) on top of the cardboard stack for weight.
5. For best results, let sit for at least 2 weeks or until the specimen is fully dried.



Plant should be as flat as possible!

Cardboard sandwiching the specimen



Make sure your book stack covers your plant fully



START A PLANT COLLECTION

STEP 3: MOUNT

MATERIALS FOR MOUNTING:

- Dried plant specimen
- Elmer's glue
- Water
- Tweezers
- Small paintbrush
- Wax paper
- Small bowl
- 2 pieces of flat cardboard
- Thick paper (such as cardstock, watercolor paper, etc.) cut to your preferred size
- Plastic plate (or other non-porous hard surface)

MOUNTING STEPS:



1. In a small bowl, mix equal amounts of water and glue together (you'll be using this to mount your plant).
2. Before applying glue, place your plant on top of your thick paper and decide where you want it to lay.
3. Use a paintbrush to spread a thin layer of glue mixture onto your plastic plate. If you do not have a plate or other non-porous hard surface for this, then you can simply use the paintbrush to gently brush the glue onto the back of your plant.
4. Use tweezers to pick up your plant and place it on top of the glue. Gently press the plant down into the glue with the tweezers.
5. Use tweezers to carefully pick up your glue-coated plant and place it back onto your thick paper.
6. Slide cardboard under the thick paper as a support; place wax paper on top of your plant to protect it.
7. Add another cardboard piece on top of the wax paper.
8. Layer heavy books on top. Let sit for 3 days or until glue is dry.
9. Congratulations - you have your first specimen! Use a pencil to write on the paper the name of the plant and your notes of when and where you collected it.

WHY COLLECT PLANTS?

Collecting plants is one way to take our time to observe life carefully.

Comparing plants helps us learn about ecosystems and the important roles plants play in nature. Studying plant collections helps us learn about invasive species, climate change and even how to protect our environment.

The Burke Museum's plant collection, or Herbarium, is preserved so many generations of researchers can study them.



CHECK OUT THIS MOUNTED PLANT FROM THE HERBARIUM COLLECTION!

The corner label lists:

- Who collected the plant
 - Scientific name
 - Common name
 - Location found
 - Date found

WAIT! DON'T LEAF YET!

There are so many more wonderful ways to learn about plants. See below for some additional activity ideas and other resources for you to use at home.

BURKE RESOURCES:

- Read about the [madrone tree specimen](#) that was the first object moved into the new Burke Museum. Just like you did with your specimen, the Burke community collected, pressed, and mounted this plant. They also made sure to write down when and where they found it.
- The Burke Herbarium does a careful collection of plants each year. Learn more about the [Herbarium's Foray Program](#), and see photos of the collection process in action.
- Search through the [Herbarium image gallery](#) to learn more about our plant collections at the Burke.
- Read about a plant collector [who confirmed a new species](#).
- Try out another [nature scavenger hunt](#) from the #Burkefromhome page.
- [Helpful resources for identifying wildflowers](#).
- Listen to interviews with tribal community members about the [importance of reviving traditional food knowledge](#).

OTHER RESOURCES:

- [Take a virtual visit to the Hibulb Cultural Center and Natural History Preserve](#) to learn more about the ways that plants are used for clothing, basketmaking, housing and canoes by Coast Salish tribal communities, and ways that they have been used since time immemorial. Check out the History Minutes, tribal artist interviews and much more.
- [Understand the important connections between foods and cultures for Native Peoples of the Pacific Northwest](#) (geared for 9-12th grade). Watch the [Foods and Cultures video](#) to get started (for all ages).
- Follow Cal Academy's [helpful presentation](#) and learn how to draw scientific illustrations! (Adults who are helping out, check out [this additional website](#) for more information.)
- Learn how to [make your own field journal](#) with recycled materials.
- If you're curious about the names of the plants, bugs and other living things you're seeing on your neighborhood walks, [check out the iSeek app!](#)
- [Learn all about pollinators and pollination strategies](#).
- Can you match the pollinator to the flower it pollinates? Play [Pick the Pollinator](#)—a game from PBS.

HOW DID IT GO? IS #BURKEFROMHOME GROWING ON YOU?

PROUD OF YOUR
MYSTERY PLANT?
MAKE A COOL
DRAWING?

WE'D LOVE TO SEE
YOUR CREATIONS!

SHARE ON
SOCIAL MEDIA
#BURKEFROMHOME

LOOKING
FOR MORE TO
DO?
Continue to
[Burke from Home](#)
with weekly
activities

INTRO (p.1)

Plants in environments

Photo: Dry desert area, Saguaro National Forest, "[Valley View Overlook Trail](#)" by jimculp@live.com is licensed under [CC BY-NC-ND 2.0](#)

Photo: Tall mountain tops, wildflowers, "[VAC110813_06205](#)" by [LDELD](#) is licensed under [CC BY-NC-ND 2.0](#)

Photo: Cold ocean waters, seagrass, "[Posidonia](#)" by [Marta T.L.](#) is licensed under [CC BY-NC-ND 2.0](#)

AMAZING ADAPTATIONS (p.2)

Find nutrients and energy

Photo: Thimbleberry, *Rubus nutkanus*, [G.D. Carr/Burke Herbarium Image Collection](#)

Photo: Moss, "[It grows](#)" by [Melkir](#) is licensed under [CC BY-NC-ND 2.0](#)

Photo: Broadleaf stonecrop, [Ben Legler/Burke Herbarium Image Collection](#)

Photo: Pitcher plant, "[Clump of purple pitcher plants](#)" by [USFWS/Southeast](#) is licensed under [CC BY 2.0](#)

Protect Themselves

Photo: Stinging nettles, [Ben Legler/Burke Herbarium Image Collection](#)

Photo: Douglas-fir (detail), "[6b. Douglas-Fir Bark](#)" by [kqedquest](#) is licensed under [CC BY-NC 2.0](#)

Photo: Hawthorn, [Ben Legler/Burke Herbarium Image Collection](#)

Photo: Sagebrush, [Ben Legler/Burke Herbarium Image Collection](#)

Reproduce and Disperse

Photo: Cattail, "[Cattails](#)" by [fishhawk](#) is licensed under [CC BY 2.0](#)

Photo: Pinecones, Ponderosa pinecone, [Ben Legler/Burke Herbarium Image Collection](#)

Photo: Blackberries, [Ben Legler/Burke Herbarium Image Collection](#)

Photo: Giant Dutchman's pipe, *Aristolochia gigantea*, "[Aristolochia gigantea](#)" by [douneika](#) is licensed under [CC BY-NC-SA 2.0](#)

PLANT SENSES (p.3)

Photo: Sunflower (heliotropism), [Image](#) by [Morgan R. Turner](#) is licensed under [CC BY-NC-ND 2.0](#)

Photo: Mangrove roots (hydrotropism), "[Three Hundred Peaks National Park](#)" by [martindiepeveen](#) is licensed under [CC BY-NC-SA 2.0](#)

Photo: Curled rhododendron leaves (thermotropism), "[cold rhododendron leaves](#)" by [Dave Bonta](#) is licensed under [CC BY-NC-ND 2.0](#)

ENVIRONMENTS MATTER (p.3)

Photo: Dry desert area, Saguaro National Forest, "[Valley View Overlook Trail](#)" by jimculp@live.com is licensed under [CC BY-NC-ND 2.0](#)

Photo: Rainforest landscape, Quinault Rainforest, [Image](#) licensed under [CC0 1.0](#)

Photo: Cactus, "[IMG_1873](#)" by [nineole](#) is licensed under [CC BY-NC-ND 2.0](#)

Photo: Licorice fern, [Ben Legler/Burke Herbarium Image Collection](#)

PLANT INFO CARDS (p. 5–6)

Photo: Lodgepole pine, *Pinus contorta* var. *latifolia*, [Ben Legler/Burke Herbarium Image Collection](#)

Photo: Lodgepole pine (detail), [Ben Legler/Burke Herbarium Image Collection](#)

Photo: Big leaf maple, *Acer macrophyllum*, [Ben Legler/Burke Herbarium Image Collection](#)

Photo: Big leaf maple (detail), [G.D. Carr/Burke Herbarium Image Collection](#)

Photo: California Fuschia, *Zauschneria californica*, [Image](#) is licensed under [GNU Free Documentation License, version 1.2](#)

Photo: California Fuschia, *Zauschneria californica* (detail), "[Epilobium canum ssp. canum #2](#)" by [J.G. in S.F.](#) is licensed under [CC BY-NC-ND 2.0](#)

Photo: Ponderosa pine, *Pinus ponderosa*, [G.D. Carr/Burke Herbarium Image Collection](#)

Photo: Ponderosa pine (bark detail), *Pinus ponderosa*, "[Lava Bark](#)" by [visualrhetor](#) is licensed under [CC BY-NC 2.0](#)

Photo: Coconut palm (trees), *Cocos nucifera*, "[Cocos nucifera \(coconut palms\) \(Eleuthera Island, Bahamas\) 2](#)" by [James St. John](#) is licensed under [CC BY 2.0](#)

Photo: Coconut palm (coconuts), *Cocos nucifera*, "[Cozumel](#)" by [quirkyjazz](#) is licensed under [CC BY-NC-ND 2.0](#)

Photo: Columbia prickly pear, [G.D. Carr/Burke Herbarium Image Collection](#)

Photo: Columbia prickly pear (detail), [G.D. Carr/Burke Herbarium Image Collection](#)

Photo: Western red cedar, [Ben Legler/Burke Herbarium Image Collection](#)

Photo: Western red cedar (detail), [G.D. Carr/Burke Herbarium Image Collection](#)

Photo: Pacific willow, [Image](#) licensed under [CC BY-SA 2.0](#)

Photo: Pacific willow (detail), [Ben Legler/Burke Herbarium Image Collection](#)

Photo: Dracula orchid, *Dracula bella* (detail), "[Dracula bella, Colombia](#)" by [Kenneth Lu](#) is licensed under [CC BY 2.0](#)

Photo: Vine maple, [G.D. Carr/Burke Herbarium Image Collection](#)

Photo: Vine maple (detail), [Ben Legler/Burke Herbarium Image Collection](#)

SO YOU THINK YOU CAN MATCH (p. 7)

All photos from PLANT INFO CARDS (p. 5–6), credits above.

PLANT COLLECTION

Photo: Herbarium example, [Consortium of Northwest Herbaria](#)

All other photos by the Burke Museum.