NATIONAL GEOGRAPHIC

GUIDE TO BIOBLITZ

FOR AFTERSCHOOL PROGRAMS

A program in conjunction with iNaturalist.org

NATIONAL GEOGRAPHIC

WHAT IS A BIOBLITZ?

A BioBlitz is an opportunity to take a snapshot of the biodiversity, or variety of life, in a specific place. In a BioBlitz event, students, scientists, naturalists, and other community members join together to find and identify as many plants, animals, and other organisms as possible in a short period of time.

Afterschool programs are ideal for giving youth opportunities to look for and observe different species around them in a living outdoor science lab. This science lab can be an area large or small with trees, shrubs, weeds, or even a rotting log, and it can be rural, urban, or suburban. BioBlitzes are held in local, state, and national parks, and also schoolyards, community center grounds, or backyards. They can be aquatic, focusing on life in water, terrestrial, focusing on life on land, or both.

Youth in a BioBlitz become explorers, exercising and refining the knowledge, skills, and attitudes that National Geographic Explorers use to better understand and succeed in the world, as outlined in our Learning Framework. Youth explorers put attitudes of curiosity and responsibility to work. They practice skills of observation, communication, collaboration, and problem solving as they build knowledge and understanding of our ever-changing and interconnected world. And they find motivation for life-long learning while they're at it.

Thank you for giving youth the opportunity to develop as explorers while they BioBlitz!

VICKI PHILLIPS
CHIEF EDUCATION OFFICER
NATIONAL GEOGRAPHIC SOCIETY

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PLANNING A BIOBLITZ

This guide is designed to help after-school and other informal education programs organize and lead BioBlitzes for youth. Here you will find ideas for setting goals, incorporating science, finding expert help in your community, planning for the event, finding organisms, and using technology to enhance the BioBlitz. Also included are links to additional resources as well as a planning worksheet and reproducible data sheets for use during the BioBlitz.

BIOBLITZ GOALS

Why hold a BioBlitz? BioBlitzes build both community among people and connections with natural environments. They engage participants—from young children to experts—in an immersive exploration of their local biodiversity and promote awareness of the importance of understanding our natural world.

When planning a BioBlitz, you will want to determine the goals for youth engagement. These events have many potential benefits or outcomes for youth, such as:

- Enabling them to embrace their own curiosity about the natural world
- Building knowledge of their local plants and animals through hands-on experience
- Extending science learning in school
- Developing skills of inquiry, communication, and collaboration
- Practicing using technology in new ways to record observations of living organisms
- Collecting real scientific data
- Connecting art with science by sketching or drawing
- Meeting scientists or other experts in person and conducting field science with them, opening the door for mentoring and future career or volunteer opportunities
- Participating in place-based learning to build deeper connections to a schoolyard, neighborhood, or community, helping youth care about their world

Organizing and conducting a BioBlitz can benefit afterschool programs by providing opportunities for:

- Youth leaders and youth to practice being life-long learners together as a community with scientists and experts
- Youth leaders and youth to become citizen scientists while using mobile technologies and contributing to science
- Programs to build vibrant partnerships with universities, nature centers, or other community organizations

BIOBLITZ SCIENCE INQUIRY

A BioBlitz involves asking questions. These questions can help guide learning, science outcomes, and discussion. Scientists and others focusing on ecology often ask questions such as:

WHAT'S HERE?

- How many different species are here?
- What signs of wildlife are here—scat, tracks, bones, feathers, or marks?
- Which stages of life—egg, pupa, larva, juvenile, adult?
- Which species are surprising to find here?
- In which of these groups are we finding the most species: plants, insects, birds, mammals, or another group?
- Are any of the organisms found "captive" (such as pets, or in a zoo) or "cultivated" (such as planted in a vegetable garden, pot, or other landscaped area)?

WHY HERE?

- Why do you think these birds, insects, spiders, or other animals are here?
- What conditions make it possible for plants to grow and animals to survive here?
- Are migratory species passing through this area?
- In what ways are plants and animals here interdependent?

WHY CARE?

- How do humans affect this natural environment?
- How does this natural environment affect humans?
- In what ways would this place be different without the plants and animals found here?
- Why is it important to protect biodiversity?

FINDING EXPERTS

A BioBlitz can give a young person the opportunity to learn side-by-side with a biologist, entomologist, botanist, ornithologist, or other type of ecology expert. And learning to find, observe, and identify organisms like the experts can impact learning for a lifetime. Here are tips for finding and engaging these role models for youth:

- Contact universities or local nature organizations for experts who will share their knowledge and help with finding and identifying species.
- Ask if local graduate students in biology, ecology, or related departments are willing to help; being early career, they often relate well to young audiences.
- Seek out volunteer "master naturalists," trained through state extension offices—typically eager to teach people of all ages about ecology.
- Call science museums, local and state parks, and nature centers to see if they will help find scientists or naturalists through their networks.
- Ask if these experts are willing to bring equipment useful during a BioBlitz.
- Don't be shy about asking for volunteers; many people appreciate an invitation, and if unable to help, they will often point you toward others who can.
- Be sure to thank your experts and let them know about the impact they had on your BioBlitz and youth.

Often scientists are not experts at working with youth. Try to pair them with a staff leader so that the expert can focus on sharing the science. Staff might also help facilitate data collection with technology or on paper, while the scientists/experts demonstrate finding and identifying species.

EVENT ORGANIZATION

BioBlitzes, especially for new audiences, will have the best results with advance planning. **(See the Planning Worksheet, page 20)**. You will want to prepare for the setting, numbers of adults and youth, equipment needs, safety, and the flow of the event.

SETTING

For the setting, consider any needs related to weather and moving from place to place. Sometimes a map is helpful for assigning areas to explore.

SUPPLIES AND EQUIPMENT

For supplies and equipment, ask community parks or nature centers if they can lend insect nets, bug boxes, magnifying lenses, paper field guides, binoculars, microscopes, or clipboards. Local businesses might donate refreshments. Plan to ask participants to bring reusable water bottles, and borrow water coolers for refills if needed.

TECHNOLOGY

If you plan to use technology such as iNaturalist or Seek, make sure adults and older youth bring smartphones fully charged and with the apps already downloaded. If using data sheets, have copies, clipboards, sharpened pencils, and colored pencils/crayons.

BASECAMP

Set up a "basecamp" area where people and supplies are gathered. This can simply be a set of picnic tables stocked with water, snacks, first aid kits, and supplies. Or use a covered area and have tools for active learning such as microscopes and a laptop with wifi and monitor for looking at BioBlitz data on iNaturalist. The group can gather here to identify, observe, photograph, upload/download data, and display anything related to the BioBlitz and its inventories.

SAFETY AND EMERGENCY PLANNING

Like any quality afterschool and summer learning activity, BioBlitzes require safety and emergency preparation. Although precautions will differ depending on the number of participants and the location, there are several universal considerations. Have first aid, water, and bandages on hand to deal with minor on-site injuries. Follow program policies and procedures to determine best responses to emergencies, including keeping emergency contact numbers and procedures handy in the case of injury. Make adults and youth aware of actions necessary to handle an emergency situation.

DURING THE BIOBLITZ

EVENT KICK-OFF CHECKLIST

Kick-off with an enthusiastic tone and set participants up for BioBlitz success:

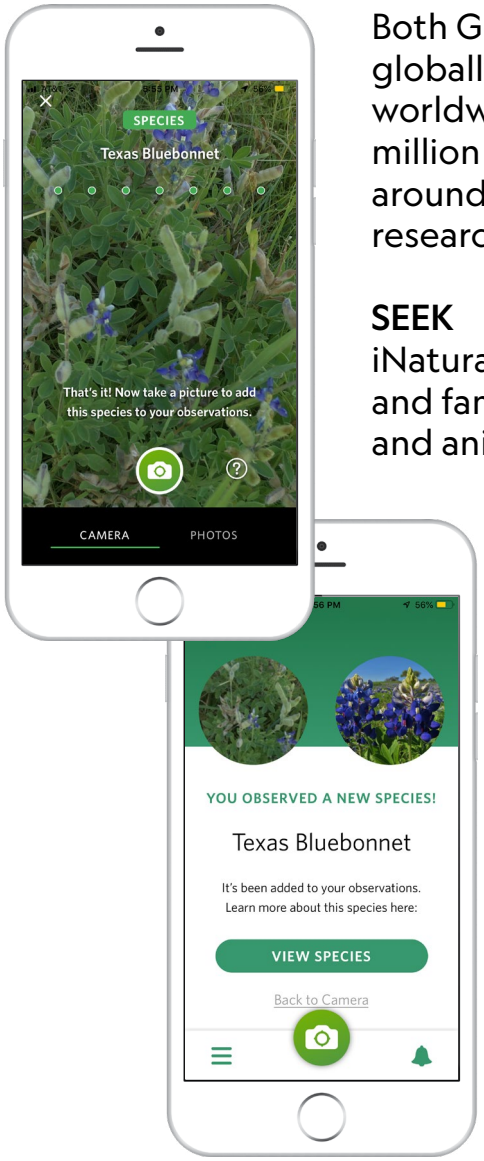
- ☐ Gather everyone at basecamp and give an overview of goals for the event
- ☐ Introduce any experts, volunteers, or other guests
- ☐ Ask youth about their expectations, such as what they expect to find, what they hope to see
- ☐ Review safety and event logistics
- ☐ Review the plan for collecting data, with technology, paper, or both
- ☐ If using iNaturalist, demonstrate how to use the app (optional: show the project main page on a laptop, monitor, or projected)
- ☐ Distribute tools and equipment to different groups as needed

Send teams off to explore! Remind them when to return to basecamp.

BIOBLITZ TECHNOLOGY: iNaturalist AND SEEK

In a BioBlitz, participants can become "citizen scientists" as they contribute observation data to science. You can set up projects on iNaturalist.org to view and filter your group's BioBlitz observation data or use the SEEK app to identify species. iNaturalist is a joint initiative of the California Academy of Sciences and the National Geographic Society.

When using the iNaturalist app, any observations that are verified by experts can earn "research grade" status. These observations become part of a Global Biodiversity Information Facility (GBIF.org) data set and Encyclopedia of Life (EOL.org).



Both GBIF and EOL can be accessed by researchers globally—so your BioBlitz data can be useful locally and worldwide. As of June 2019, iNaturalist has nearly 24 million observations from more than 640,000 observers around the world, and 14 million+ observations are research grade!

SEEK

iNaturalist also has a tool that helps young people and families to explore, called Seek. Identify plants and animals in a few quick steps with this app. While exploring outside, point the Seek camera at living things. Follow the instructions on screen, and the image recognition technology will identify different types of plants, birds, amphibians, insects, fungi, and more. Seek helps to classify to the species level where possible, earning participants virtual badges.

Seek does not require registration or collect user data, so it's safe and private. This can be helpful when students are identifying organisms during a paper based BioBlitz data collection. From Seek you can optionally submit observations to iNaturalist, but it is neither automatic or required.

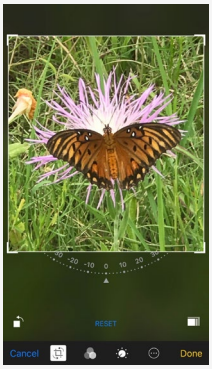
INATURALIST

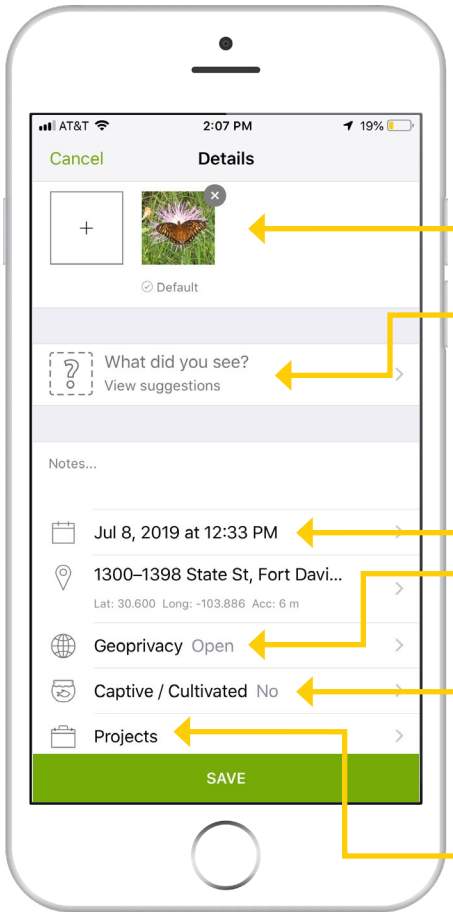
Using the iNaturalist app, youth can learn as they collect actual science data. Like Seek, they take photos of living things. With iNaturalist these observations are shared with a network of enthusiasts and experts.

As a social network for nature fans, iNaturalist is a community where observations are reviewed, confirmed, or changed by others. Because of this community interaction, creating a personal account requires a minimum age of 13 to participate. Programs working with youth under age 13 can create group accounts tied to a leader's email address who will steward the account and answer questions from the community. A group account can also be helpful for monitoring and editing observations.

You can find detailed recommendations for using iNaturalist with youth in this teacher's guide: **www.inaturalist.org/pages/teacher's+guide**.

Here are tips for getting started with the iNaturalist app. We recommend that educators make 10-20 practice observations before teaching youth how to use it.





First, take several photos and edit your top choices. Crop to make the organism large in the frame.

In the app, select Observe then upload your photo(s).

What did you see? Tap to see species suggestions. Look for **visually similar/seen nearby**. Select one.

Time, date, and location will auto-fill.

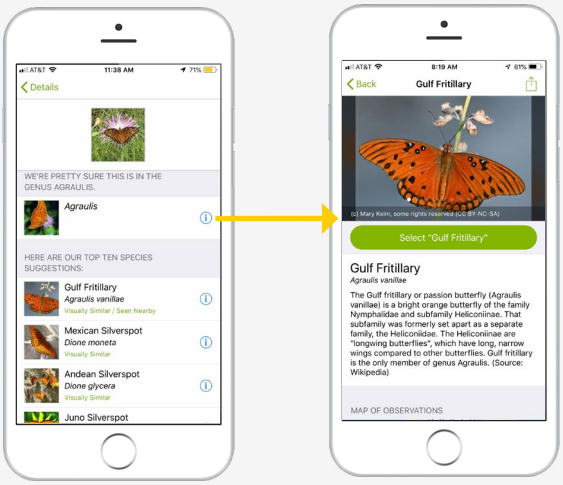
Geoprivacy can be open (displays the location) or changed to obscure (shows the general location) or made fully private (no location displayed).

Captive/Cultivated is for non-wild species. Pets, animals in zoos, garden/potted plants should be checked "yes."

Select a **Project** where you want your data included (this is not needed for BioBlitz events), to pull in all data for the set place and time. Now **Save** or **Share**.

You can **Edit** to make changes in the app or on **iNaturalist.org**. Log in to see your observations and more.

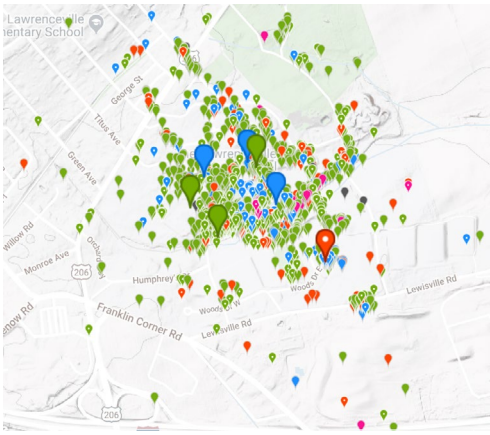
Screenshots are shown on iPhone and may look different on Android devices.



ⓘ *will show helpful photos, a description, and a map.*

CREATE A PROJECT

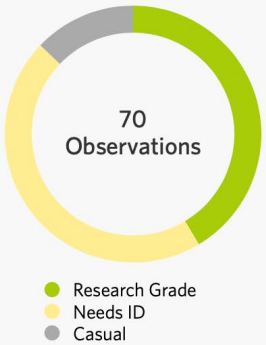
On iNaturalist.org, your organization can create a "project" for your BioBlitz events where each participant's data from the event will be compiled. To do this, go to **iNaturalist.org** –> **Community** –> **Projects** –> **Start a Project**, and follow the instructions for a collection project. As BioBlitz participants record observations, everyone can view, refine, and analyze the observation data in photos, maps, and charts.

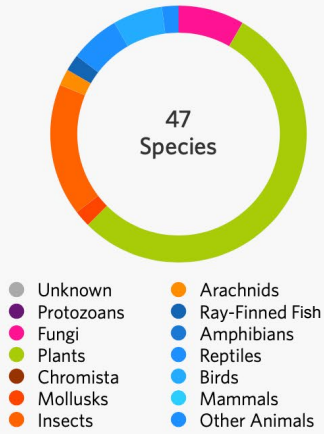


Projects are also ideal for collecting data over a longer period of time to track changes in seasons or from year to year.

Find more resources for your BioBlitz on **NatGeoEd.org/BioBlitz**, and remember to check out the teacher's guide on **iNaturalist.org** for more guidance!

Stats





iNaturalist

CALIFORNIA ACADEMY OF SCIENCES NATIONAL GEOGRAPHIC

TIPS FOR FINDING ORGANISMS

Here are expert tips for observing and collecting data for various taxa:

MAMMALS

- It's not easy to spot mammals, but evidence of their presence including scat, tracks, and bones are appropriate proof of an observation.

PLANTS

- Take photos of parts at different scales: the whole plant or tree, a leaf, the flowers, and the seeds.

MUSHROOMS

- Photograph the cap, underside of cap and stem, and with substrate including leaves nearby.

INSECTS

- Collect crawling insects with a plastic petri dish, and flying insects with a net.
- Find a number of insects hiding in plants by using a stick to shake a bush over a sheet placed underneath.
- To find ground dwellers, place leaf litter on a tray and sort through it, using a hand lens to magnify tiny moving specks that just might be insects.
- Use a macro lens on a smart-phone for photos to get magnified images of the entire insect plus close-ups of the head, mouth parts, and the rear.
- Butterflies can often be photographed more easily when not caught with a net, which can also break fragile wings.

BIRDS

- Use binoculars or cameras with a zoom lens.
- Consider setting up bird feeders to attract birds to your space.

AQUATIC ORGANISMS

- Use a seine to collect organisms in shallow areas.
- Temporarily place animals in water from the source in an aquarium or other clear bin for viewing and photographing.
- A macro lens clipped to a phone can help with taking photos of tiny organisms.

All taxa: Local field guides are great for preparing people for what they might observe!

CLOSING STEPS

CHECKLIST

At the event's end, bring everyone together to discuss the tally of observations and species. Display the project page on a monitor, if possible, showing observations in list and map mode, or simply show a poster with a tally for different groups of animals, plants, or fungi. Some closings have included creative celebrations, with unique moments such as a choreographed BioBlitz dance! Feel free to get creative. A checklist for the closing:

- ☐ Extend thanks to all participants, experts, and organizers
- ☐ Have experts share what they observed in the field and in the youth's work
- ☐ Celebrate overall accomplishments, including participants with the most observations and species, unique findings, and any other discoveries
- ☐ Ask the group about highlights from their exploration: *In what ways did their learnings relate to their lives and the larger community? And What might we explore next?*
- ☐ Possibilities for sharing findings with larger community; Ask: *What do participants think others should know about the life around them? How can we share this experience?*

You may want to share success with local media contacts or create a post for a blog or to send over email. Please check the program photo release policies before sharing images of participants.

> **"We can rewild our natural world. We can go into our schools and do BioBlitzes, we can go into our backyards, we can think about what it takes to have whole functioning nature."**
>
> **JOHN FRANCIS**
> NATIONAL GEOGRAPHIC/NATIONAL PARK SERVICE BIOBLITZES

AFTER THE EVENT

Consider using the data after the BioBlitz to extend participants' learning. If you used iNaturalist, check your project to view all of the observations together. This is a good time to talk about everyone's contributions and the need to share quality data with iNaturalist. Together, make sure all observations are identified at least as plants, mammals, birds, etc., helping others in the iNaturalist community with further identification.

If you used data sheets where youth sketched what they found, let them create a book, wall display, or other way of communicating their results. Include highlights from the event.

And, of course, involve youth in sending thanks to experts and other volunteers, and any organizations that donated to the event. Consider how to deepen connections with volunteers and experts to inspire young people to be explorers and citizen scientists for future events.

Next, consider arranging a field trip to a local park, inviting a guest speaker around biodiversity, or arranging a video call via Explorer Classroom!
(see resources next page)

BIOBLITZ RESOURCES

Below are a few resources to build on the information provided in this guide.

National Geographic BioBlitz Resources:
Classroom and outdoor learning activities for before, during, and after a BioBlitz, including additional guidelines and other media resources for event planning and inspiration.
https://www.NatGeoEd.org/BioBlitz

iNaturalist BioBlitz Guide:
Detailed how-tos for using iNaturalist for a local BioBlitz.
https://www.iNaturalist.org/pages/bioblitz+guide

iNaturalist Teacher's Guide:
Recommendations for using iNaturalist for K-16 student learning.
https://www.iNaturalist.org/pages/teacher%27s+guide

City Nature Challenge:
Information about an annual biodiversity competition.
http://citynaturechallenge.org

City Nature Challenge Education Toolkit:
Classroom activities, field investigations, media, and guides to prepare students, nature center visitors, homeschools, and more for the CNC.
http://citynaturechallenge.org/education-toolkit/

Australia BioBlitz Hub and Guide:
Guidance for setting up a large BioBlitz for 100-1,000 participants.
https://citizenscience.org.au/the-australian-bioblitz-hub/

U.K. Natural History Museum BioBlitz Guide:
https://www.nhm.ac.uk/content/dam/nhmwww/take-part/Citizenscience/bioblitz-guide.pdf

About Seek by iNaturalist:
https://www.iNaturalist.org/pages/seek_app

National Geographic Explorer Classroom:
Find explorers and ask questions about the organisms found on BioBlitz.
https://www.NatGeoEd.org/explorerclassroom

BIOBLITZ PLANNING WORKSHEET

BioBlitzes are like organisms, a variety of shapes and sizes.
Use this worksheet to guide your event planning.

GOAL SETTING

What are the BioBlitz goals?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

LOGISTICS

BioBlitz location: _____

Date(s) and time: _____

Number of youth participants: ____

Supplies: *(circle what you and participants have; underline what you need; cross off what you don't, and add more in the space below)*

Smartphones	Bins/pans *(for leaf litter)*
Tablets	Data sheets
Laptops	Clipboards
Cameras	Petri dishes
Nets	Microscopes
Binoculars	Magnifying lenses
Macro Lenses	

_____

_____

_____

BIOBLITZ PLANNING WORKSHEET

DATA
Will you use paper data sheets, iNaturalist, or Seek?

How and when can you get participants familiar with the data collection process?

PEOPLE
Possible Experts: Brainstorm different types of helpful expertise.

Youth Voice: What ownership will youth have over the activity? How will you support youth to share their ideas, observations and voice their opinions?

You're on your way to having a BioBlitz event! See **NatGeoEd.org/BioBlitz** for more resources and ideas for activities.

BIOBLITZ OBSERVATION

Observer Name: _____ **Date:** _____

Look for a wild plant, animal, or other organism. Sketch and label it here.

Common Name: _____ **Scientific Name:** _____

(Use field guides, technology such as iNaturalist, or ask an expert to help you name the organism.)

Notes about the organism: describe is its size, color, markings, location, or behavior. How many are there? Are other organisms near it?

_____

_____

_____

SPECIES IDENTIFICATION CARDS

DESCRIPTION/IMAGE:

Family: ______________________

Scientific Name:
(Genus & Species) ______________________

Common Name(s): ______________________

Observation Location: ______________________

Identified By: ______________________

Date Observed: ______________________

DESCRIPTION/IMAGE:

Family: ______________________

Scientific Name:
(Genus & Species) ______________________

Common Name(s): ______________________

Observation Location: ______________________

Identified By: ______________________

Date Observed: ______________________

DESCRIPTION/IMAGE:

Family: ______________________

Scientific Name:
(Genus & Species) ______________________

Common Name(s): ______________________

Observation Location: ______________________

Identified By: ______________________

Date Observed: ______________________

DESCRIPTION/IMAGE:

Family: ______________________

Scientific Name:
(Genus & Species) ______________________

Common Name(s): ______________________

Observation Location: ______________________

Identified By: ______________________

Date Observed: ______________________

DATA SHEET

Observer(s): _____ **Date:** _____ **Place:** _____

Species (common and/or scientific name)	Number Observed	Time	Notes (on specific location, certainty, life stage, etc.)	Observer Name

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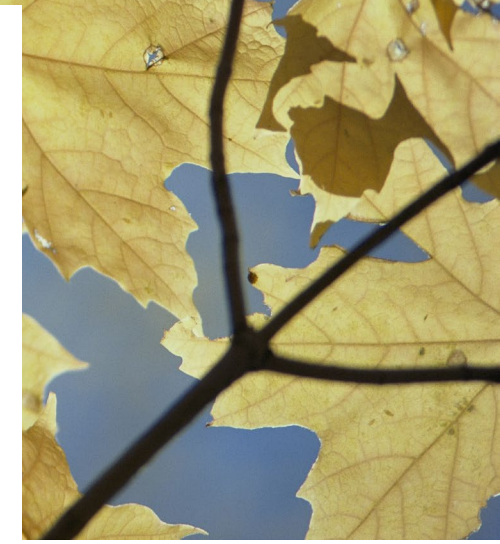

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