PUBLIC LANDS ENGAGEMENT

Focus on Environmental Education in Nature

NEEF

How to Use this Guide

This engagement guide is intended to support high-quality environmental education activities during community engagement events of all types and sizes.

It includes descriptions, real-world examples, recommendations, and related resources for a variety of environmental education activities. There are links provided along with each activity that will lead you to additional resources, related organizations or groups, and further event ideas. If you are searching for inspiration to make your event a success, follow the links to discover more information.

As you plan your event, remember that any environmental education activity that you choose to include should ideally have some connection to the event theme or location. While many of the activities found in this guide can be used without modification, there are some simple ways to adapt them to your local event. Here are three suggestions to increase the relevancy and effectiveness of an activity.

• Consider adding some degree of interpretation to make an activity more accessible to your audience.

• Substitute local species and habitats during an activity to illustrate local connections and importance.

• Conduct a short debrief after an activity that encourages participants to share what they have experienced, learned, or plan to do differently going forward.

Our intention is that this guide serve as an inspirational launching point for the incorporation of environmental education into public engagement events, to fortify and strengthen our public lands for generations to come. These environmental education activities can be added to events to supplement them and give participants a well-rounded experience.

We hope that all who read this guide, whether you are an experienced educator or new to planning community events, will see that incorporating environmental education can be easily accomplished with a plethora of benefits for the environment, the participants, and the community as a whole.

Acknowledgements

Contents

Environmental Education Goals and Objectives

Environmental education is intended to help people of all ages understand and appreciate the natural environment and our country's natural resources—and the need to conserve and steward those resources for future generations. Environmental education is an experiential process that allows individuals to explore environmental issues, engage in problem solving, and take action to improve the environment.

The overall goals of environmental education include:

- Fostering clear awareness of, and concern about, environmental, economic, social, and ecological interdependence in urban and rural areas;

- Providing every person with opportunities to acquire the knowledge, values, attitudes, skills, and commitment needed to protect and improve the environment; and

- Creating new patterns of positive behaviors by individuals, groups, and society as a whole towards the environment.

Awareness **Appreciation** **Action**

Specific objectives of environmental education include:

- Awareness—to help social groups and individuals acquire an awareness and sensitivity to the total environment and its allied problems.

- Knowledge—to help social groups and individuals gain a variety of experiences in, and acquire a basic understanding of, the environment and its associated problems.

- Attitudes—to help social groups and individuals acquire a set of values and feelings of concern for the environment and the motivation for actively participating in environmental improvement and protection.

- Skills—to help social groups and individuals acquire the skills for identifying and solving environmental problems.

- Participation—to provide social groups and individuals with an opportunity to be actively involved at all levels in working toward resolution of environmental problems.

Through structured experiences and learning activities, targeted to varying age groups and populations, environmental education enables people to realize how human activities and ecosystems affect each other and how natural resources can be used wisely. As a result, individuals develop a deeper understanding of environmental issues and have the skills to make informed and responsible decisions.

Environmental education is not designed, nor intended, to arrive at a single point of view or course of action. People from different cultures and different communities will bring their own perspectives and knowledge funds that need to be recognized and respected. Anyone can learn about an environmental challenge, then can go back and teach others from their community. Even a small effort to share knowledge and experiences among groups and communities can lead to a number of positive and lasting changes.

Benefits of Environmental Education

In addition to simply learning about and connecting with the environment that surrounds us, there are many other benefits of environmental education. It can encourage environmental stewardship, strengthen communities, deepen personal well-being, and improve academic achievement. Environmental education offers an array of enriching topics that are great for engaging community members from all backgrounds and ages.

Encourages Environmental Stewardship

In the environmental education field, educators hope to deliver lessons and experiences that will cause students to learn about and understand the environment. Often, environmental education is considered successful when students grasp environmental concepts, identify cause and effect relationships, and understand the implications of their actions. Environmental education also has the ability to take this retained knowledge one step further, by causing environmental stewardship behaviors in its learners. Environmental education encourages environmental stewardship by:

- Developing skills for effectively addressing ecological issues,
- Increasing an individual's capacity for future conservation efforts, and
- Motivating people to improve the environmental value of their surroundings.

Strengthens Communities

During environmental education experiences, there are often components of environmental remediation as part of the learning. These remediation efforts can aim to restore natural habitat, clean up pollution, and

more. When the natural landscape is positively changed by groups, the entire surrounding community is impacted. Completing such community-based stewardship projects or civic ecology practices can be beneficial for the entire community and those living in it.

Improves Academic Achievement

Deepens Personal Well-being

Spending time in nature is thought to have restorative effects. Luckily, environmental education draws people outdoors and allows learners to focus their minds on natural landscapes and concepts. Through learning about environmental education topics, we can deepen our personal development and support our all-over well-being. Learning about and connecting with nature benefits us because it:

- Improves cognitive, cardiovascular, and immune functioning;

- Reduces crime, aggression, and antisocial behavior;

- Reduces symptoms of attention-deficit/ hyperactivity disorder or ADHD in children; and

- Improves psychological well-being.

Using outdoor settings like the schoolyard, nearby parks, or public lands like wildlife preserves, forests, grasslands, wetlands, or even national parks can infuse a sense of richness and relevance into a traditional school curriculum. In addition to gaining valuable skills and environmental knowledge, students often experience advances in other academic areas. Some ways that environmental education improves academic achievement include:

- Improving student engagement and academic achievement,

- Developing confidence to investigate and solve local problems,

- Fostering interest in STEM careers,

- Enhancing creativity,

- Promoting intellectual development,

- Encouraging inspiration, and

- Teaching students how to ask questions and examine contextual information.

America's Growing Disconnection from Nature

In recent years, researchers have noticed a disconcerting trend: Americans are spending more and more time indoors and less time outside. Participation in traditional nature-based recreation is stagnant or declining. The Outdoor Foundation's 2019 Outdoor Participation Report found that Americans went on one billion fewer outdoor outings in 2018 than they did in 2008. A study by the Nature of Americans found that some groups, especially people of color, younger adults, and urban and suburban residents, "encounter additional barriers, including discomfort being outdoors alone, a lack of financial resources, and a lack of social support, such as adults to accompany children outside or friends to encourage other adults to make time for nature".

Interestingly, while Americans continue to disconnect from nature, there is also a growing body of evidence that human health and well-being are dependent on meaningful contact and experiences in nature. There have been a wide range of scientific studies published on the health benefits of nature over the past 35 years, which confirms that spending time in nature can have a positive influence on human physical, mental, and social health. Taken as a whole, these studies provide a compelling case for investing in programs and initiatives that promote connections between education, health, and nature in our communities.

Public Lands Help Us Reconnect

Public lands are uniquely positioned to help Americans reconnect with nature. Public lands—such as national parks and forests, local and state parks, urban green spaces, and other natural areas—offer unique, place-based opportunities for people of all ages to explore the outdoors and learn more about nature through hands-on participation in environmental education activities.

Research from The Nature of Americans, a 2015-2016 study indicates "that occasional contact with the natural world is insufficient to instill in children and adults the curiosity, wonder, and connection needed for nature to become a meaningful part of their lives". Thus, in order to experience and secure the benefits of time spent in nature, one must spend time in nature regularly, so that it becomes habitual and part of all aspects of their lives.

Urban Nature for Human Health and Well-Being

A 2018 report by the USFS National Urban Forest Technology and Science Delivery Team summarizes the most current research related to nature and public health, providing a resource to help natural resource professionals, health professionals, urban planners, architects, educators, and community groups effectively communicate the health benefits of nature to their constituents.

The report provides an overview of the current research in five key areas: pollution and physical health; active living; mental health; stress reduction; and social health, community cohesion, and resilience, and discusses issues of social equity and access to nature in urban environments and rural communities.

Initiating an Environmental Education Activity Sequence

In the fields of experiential and outdoor education, activity leaders use frontloading and framing to introduce an activity. Frontloading is making clear the purpose, goal, or focus of an activity before participating in it. Framing often starts with a description of the activity, it can include the use of a relevant story or metaphor. It continues with putting the activity into context, which allows participants to build on their prior knowledge and experiences. It should include any safety concerns and establish all the rules or boundaries. The activity leader also needs to demonstrate any technical skills required for successful completion of the activity—maybe even allowing participants to practice to better ensure successful outcomes. Lastly, framing can be used to present facts about an issue or problem that needs a solution—without offering one—potentially deepening participant interest and engagement.

Framing → **EE Activity** → **Debrief**

Starting with how the activity is framed (e.g. as a local, regional, national, or global issue), you can include examples that establish the appropriate context (e.g. conservation, resource management, stewardship, etc.). Below are general themes that one or more of the environmental education activities in this guide represents. For each theme, there are some example talking points and calls to action intended to help facilitate framing and debriefing when conducting environmental education activities with participants.

Conservation focused activities

Conservation is defined as "the care and protection of natural resources, so they persist for future generations". It is not to be confused with preservation, which has the goal of protecting nature from any human use. When practicing conservation, nature can still be used by humans, but it must be used in a sustainable way so that its resources are not depleted. We can see the difference between conservation and preservation exemplified in the public lands of the United States. National Parks are natural areas that have been preserved with minimal change to the environment. National Forests are designated areas that "can be used for grazing, hunting, logging, and recreation".

Talking Points

- Conservation is the management of a natural resource to prevent exploitation, destruction, or neglect.
- Earth's natural resources, including air, minerals, plants, soil, water, and wildlife, need to be taken care of and protected, or conserved, so that they can persist for future generations.
- Conservation includes maintaining diversity of species, genes, and ecosystems, as well as functions of the environment, such as nutrient cycling.
- It is important to learn about conservation so that we can protect wildlife and biodiversity.
- We need to protect the environment so that ecosystems persist, function, and remain healthy.

Actions

- Plant a pollinator garden comprised of native plants.
- Embrace xeriscaping, the practice of designing landscapes to reduce or eliminate the need for water beyond what the natural climate of an area provides, primarily by using native vegetation.
- Reduce grass-covered areas. Cut grass at least three inches high to shade the roots; keep mower blade sharp.
- Use porous pavement (e.g. gravel or pavers) instead of asphalt for driveways and walkways to allow rain to recharge groundwater supplies.
- Install a rain garden or rain barrel.

Biodiversity focused activities

Biodiversity is "the variety of living species on Earth, including plants, animals, bacteria, and fungi". It can be studied on a large scale, in terms of the entire earth, or on a smaller scale, such as all the living species in one ecosystem. Biodiversity is important because when there is a wide variety of organisms contributing to the overall function of the ecosystem, it helps support overall ecosystem health. When there is evidence of a lack of or decline in biodiversity, it is indicative of other problems. Biodiversity loss is primarily caused by habitat destruction, climate change, invasive species, overexploitation, and pollution, each of which is further explained on the following page.

Invasive species

An organism is considered invasive when it "is not indigenous, or native, to a particular area". Invasive species are often destructive to the native environment, by taking space and resources from the native organisms that originally lived there, and in some cases, may eliminate native species from an ecosystem entirely. According to the National Wildlife Federation, "approximately 42% of threatened or endangered species are at risk due to invasive species". Because "many of our commercial, agricultural, and recreational activities depend on healthy native ecosystems," invasive species also pose an economic threat to humans.

Talking Points

- In order to be considered invasive, and not simply non-native, the introduced species must adapt to the new area easily, reproduce quickly, and "harm property, the economy, or the native plants and animals of the region".

- Invasive species have the potential to cause damage to ecosystems by killing off or preventing the growth of native species, which alters or destroys the natural dynamic between species.

- Invasive species can be introduced intentionally as a pest-control measure or for aesthetic reasons, or unintentionally, such as seeds transported and deposited from one area to another by clothing, footwear, or equipment.

- Invasive species can cause great economic harm, disrupting agricultural and natural resource-based industries humans rely on.

Actions

- Clean your boots before you hike in a new area.

- Don't take home any animals, plants, shells, firewood, or food from different ecosystems.

- Never release pets into the wild.

- "When boating, make sure to clean your boat thoroughly—including emptying bilge water—before putting it into a different body of water".

- Make sure the plants you are buying for your home or garden are not invasive. Contact your state's native plant society for a list of native plants.

Air pollution and air quality

Breathing air is the mechanism that humans, and countless other species, use to obtain compounds that are necessary for life. In addition to necessary compounds, such as oxygen, air may also contain compounds that pose threats to the health of humans and the plants and animals of the ecosystems that surround us. Thus, it is important to regularly monitor air quality and ensure that it is clean enough to sustain life that depends on it. Air quality can be severely impacted by air pollution, which is "any substance in the air that is harmful to people or the environment". There are many ways that air pollution can be minimized to improve air quality, such as reducing energy consumption and choosing sustainably sourced and produced products.

Talking Points

- Earth's atmosphere is mostly made up of two gases that are essential for life: nitrogen and oxygen. However, the air we breathe also contains smaller amounts of other gases and airborne particles or aerosols.

- The five major air pollutants monitored to determine air quality include: ground level ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, and airborne particles, or aerosols.

- Air quality refers to the overall condition of the air in our surrounding environments.

- Scientists regularly monitor conditions across the planet by collecting air and water quality data to know whether conditions are within established safety and health guidelines.

- Measuring air quality is important because polluted air can adversely impact human health and the health of other species.

Actions

- Choose green transportation options like walking, biking, carpooling, and public transit.

- When in the market for a new vehicle, look for the most fuel efficient, lowest-polluting model or even a zero-emission electric model.

- When purchasing appliances or electronics look for energy efficient products such as those that are ENERGY STAR® labeled.

- Telecommute for work one or more days per week.

- Choose water-based cleaning products labeled 'zero VOC.'

- Choose green building materials (e.g. low or no VOC products, etc.) when building or renovating.

Water pollution and water quality

Water is our planet's most vast resource, covering about 71% of the Earth's surface. Every ecosystem depends on water in some way because it is necessary to the survival of all plants and animals. Because it is so essential to life on Earth, water quality must be regulated and monitored to ensure that ecosystems can continue to function properly with clean water. Water pollution poses a threat to water quality, mainly in the form of "nonpoint source pollution, when pollutants are carried across or through the ground by rain or melted snow". This runoff is potentially harmful because it "can contain fertilizers, pesticides, and herbicides from farms and homes; oil and toxic chemicals from roads and industry; sediment; bacteria from livestock; pet waste; and other pollutants".

Talking Points

- Measuring water quality is important because polluted water can adversely impact human and other species' health.

- Harmful algal blooms—which close beaches and cause seafood advisories—often result from chemical contaminants in stormwater run-off.

- Scientists regularly monitor conditions by collecting water quality data to know whether conditions are within established safety and health guidelines.

Actions

- Scoop the poop! Stop animal waste from contaminating groundwater with water-borne bacteria like fecal coliform bacteria (i.e. E. coli 0157:H7).

- Don't be a litterbug, trash washed away by rain fouls creeks, rivers, lakes, and the ocean.

- Reduce or eliminate use of fertilizers, herbicides, and pesticides to avoid contaminating stormwater run-off.

- Decrease impervious surfaces (e.g. concrete, asphalt, etc.) to reduce run-off.

- Plant a rain garden with native species in depressed or sloping areas where water collects and flows through to mediate water flow and naturally filter pollutants out.

- Regularly inspect septic systems and repair or replace if needed.

- Leave riparian buffers intact; help restore riparian zones if degraded.

- Volunteer as a waterkeeper to help monitor water quality in your watershed.

Light pollution

Over the past several hundred years, humans have reshaped the natural environment through the development of our modern society. The introduction of artificial light is one change that has altered the way we see the night sky. This "excessive, misdirected, or obtrusive artificial light" is known as light pollution. Globe at Night has identified three main types of light pollution: glare, light trespass, and skyglow. The source of glare is unshielded lighting and has the potential to be a public-health hazard. Glare light pollution "causes a loss of contrast and sometimes temporarily blinds drivers leading to unsafe driving conditions". Light trespass pollution "occurs when unwanted light enters one's property (e.g. shining unwanted light into a bedroom window of a person trying to sleep)". Skyglow light pollution "refers to the glow effect that can be seen from a distance above populated areas".

Talking Points

- Light pollution is excessive, misdirected, or obtrusive artificial light.

- By viewing aerial maps of the earth at night, you can view light pollution from the atmosphere.

- Too much light pollution disrupts ecosystems, washes out starlight, interferes with research, and wastes energy.

- Light pollution is reversible.

Actions

- "Only use lighting when and where it's needed".

- Install motion detectors and timers to reduce the chance of leaving lights on when they're not needed.

- "Keep blinds drawn to keep light inside at night".

Wildfire

Fire can be an important part of maintaining diverse and healthy ecosystems, as nearly every region in the United States has some kind of fire-dependent plant or tree. At times, fire is naturally occurring and helpful, but when it is unintentionally started or improperly monitored, it has the potential to cause devastating effects to the environment. Human-caused wildfires can begin "via debris burning, campfires, arson, discarded smoking products, sparks from equipment in operation, arced power lines, and other means".

Talking Points

- Some ecosystems depend on fire to thin the forest canopy and cultivate the forest floor. This can occur naturally, or through prescribed fires, which are controlled fires introduced by fire managers.

- The National Interagency Fire Center classifies wildfires based on ignition source, with "the two primary ignition sources are lightning strikes and humans".

- Nearly nine out of 10 wildfires nationwide are caused by humans and could have been prevented.

- "Between 2009 and 2018, 88% of wildfires were classified as human-caused, while lightning strikes were responsible for 12%".

Actions

- "Never leave a fire unattended. Completely extinguish the fire—by dousing it with water and stirring the ashes until cold—before sleeping or leaving the campsite".

- "Always take care when using and fueling lanterns, stoves, and heaters. Make sure lighting and heating devices are cool before refueling. Avoid spilling flammable liquids and store fuel away from appliances".

- "Do not discard cigarettes, matches, and smoking materials from moving vehicles, or anywhere on park grounds. Be certain to completely extinguish cigarettes before disposing of them".

- "Follow local ordinances when burning yard waste. Avoid backyard burning in windy conditions, and keep a shovel, water, and fire retardant nearby to keep fires in check. Remove all flammables from the yard when burning".

Stewardship focused activities

Environmental stewardship involves "the responsible use and protection of the natural environment through conservation and sustainable practices to enhance ecosystem resilience and human well-being". Types of stewardship include restoration, monitoring, and protection, everyday behaviors, and civic action.

Actions:

- Volunteer to remove invasive species, plant native vegetation, or otherwise restore degraded, damaged, or destroyed habitat to improve biodiversity.

- Participate in a citizen science/ environmental monitoring project or start one.

- Organize or participate in clean up events on public lands.

- Participate in or start a home, school, or community-wide recycling, composting, or natural resource conservation program like Woodsy Owl's Lend a Hand—Care for the Land.

- Become and stay informed about environmental issues, then participate in civic behaviors like letter writing, speaking or presenting at community meetings, and voting.

- Practice the 4 R's in your everyday life.

Talking Points

- The environment cannot speak for itself, so it is our responsibility to ensure that it's taken care of and protected for future generations.

- Stewardship provides opportunities to connect with local ecosystems and tools that can help users/visitors understand how individual behavior impacts the environment.

- Remember the "4 R's": reduce, reuse, recycle, and rot. Reduce the amount that you consume, reuse products and materials that you already own, recycle materials properly when you are finished with them, and rot compostable materials in an at-home or community compost pile.

Completing an EE Activity Sequence

1

Debrief—Conduct a short debrief after an activity that encourages participants to share what they have experienced, learned, or plan to do differently going forward. Set ground rules to ensure everyone is on the same page. Here are some ideas:

- Take turns sharing one at a time.
- Listen without interrupting.
- Respond to ideas, not to people.

2

Circle up—Have the participants circle up for the debrief. A circle conveys that all are equal and included. To ensure all voices are valued, establish ground rules for giving feedback, then encourage everyone to contribute to the conversation. Having a short series of questions that guide the discussion is a best practice. Here are a few suggestions:

- What were your expectations for the activity?
- What is one thing you learned from the activity?
- What will you do differently because of what you've learned?
- What made the activity memorable and fun?
- What would have made the activity better?

3

Call to action—Including a non-partisan, non-advocacy call to action is a great way to inspire and empower participants to continue their engagement after the event has concluded. Here are a few examples of generic calls to action:

- Share what you've learned today with your family and friends.
- Explore local public lands near you! Check out your state and county parks, wildlife refuges, and recreation areas with digital tools like Discover the Forest, Find a Refuge, and Find Your Park.
- Practice the environmentally positive behaviors you learned in your everyday life.
- Continue learning about what more you can do by taking an environmental education course, following pro-environment social media accounts, reading books, watching documentaries, listening to podcasts, attending seminars, and more!
- Volunteer in your community to encourage and promote environmentally friendly efforts.

Environmental Education Games

Overview

Games can be used as fun and interesting ways to engage participants. While having fun, participants develop skills and gain knowledge about a topic. Using games in environmental education is especially beneficial, as it can convey complex concepts and relationships found in ecosystems. Further, games provide a safe space for participants. Players can come into a game with any level of knowledge. If learning is framed as a game, with fun being a high priority, then there is less pressure to learn the "right answer," especially if complicated topics are involved.

The example games have been selected according to their suitability in both formal and non-formal situations and their educational value. To make the environmental education connection and ensure that the message is delivered to participants, it is essential that a short discussion or debrief of the game follow its completion. Facilitating a conversation gives participants an opportunity to reflect, ask questions, and hear others' thoughts and opinions.

Tips for Success

Adapt games so that they are illustrative of your surrounding ecosystem (e.g. instead of "Bat and Moth," featured on page 27, change the game to "Dolphin and Crab" if your participants live near a coastal ecosystem).

Wildlife Viewing

Overview

Wildlife viewing is the observation of animals in their native habitats as a recreational activity. It can be done with the naked eye, through visual enhancement devices like binoculars and telescopes, or by listening for animal sounds. Many public land agencies champion wildlife viewing as a key activity.

Elevating wildlife viewing to environmental education involves additional exploration. Learning about any challenges a species may be facing (e.g. habitat loss, disease, etc.) and what can be done individually and collectively to improve the situation is at the heart of environmental education. Resources such as on-site signage or ranger-led activities are an easy way to gain a deeper understanding and appreciation of nature's myriad lifeforms and how to protect them for future generations.

Types of wildlife viewing activities

Animal viewing

Animals may be tough to spot in their natural habitat but getting a glimpse into these moments in the wild help observers gain a better understanding of these species' lives. While observing an animal in their natural habitat, we can better understand how they forage for food, where they live, and how they interact with other wildlife in the ecosystem.

Butterfly watching

Butterfly watching is the observation and identification of butterflies. With their brightly colored wings and fluttering flight paths, butterflies often catch the eyes of those around them. Their unique wing colors and patterns make each butterfly species distinct from one another—and are fun to identify!

Birding

Birding, or birdwatching, is the observation and identification of birds in their natural habitat. Birds can be observed with the naked eye or with devices such as binoculars, telescopes, or webcams. One thing that makes birding unique is that it can be done in some instances without ever seeing a bird, by listening to bird calls!

Snorkeling

Snorkeling is a great way to view aquatic life in a way that we aren't able to on dry land. Using dive masks with breathing tubes, snorkeling allows you to swim through aquatic environments to observe the vast ecosystems that lie underneath the surface of the water.

Real-World Examples

Kayak Trip

Nathan Bedford Forrest State Park, Benton County, TN

For Bedford Forrest State Park's National Public Lands Day event, park ranger Joshua Justice led a kayak trip north from Lakefront Campground to explore the area north of the campground along the Tennessee River. Since birds are most active (and the sun is less hot!) early in the morning, the trip set off at sunrise. The main section of Nathan Bedford Forrest State Park is on the Kentucky Lake, and two miles away, another part of the park, Eva Beach, was the destination of the kayak trip. Along the way, Joshua led the kayakers in a bird watch, looking for shore birds such as herons, eagles, and osprey. During the bird watch, he taught them about the birds and their habitat. During the trip, Joshua and the group stopped at one of the islands on the lake, where participants explored and took a water break. While the event participants were paddling through the birds' habitat, he took the opportunity to emphasize the importance of keeping the environment clean so that birds can continue to inhabit the area.

Tips for Success

Frame a wildlife viewing activity in terms of conservation or other challenges to build awareness and appreciation that can lead to individual or collective behavior change(s).

Resources

Birding/Citizen Science Lesson Plans

NPS: 7 Ways to Safely Watch Wildlife

Forest Service: NatureWatch

REEF's Snorkeling Safety and Protecting Marine Life Tips

Pollinator Partnership's Learning Center

Cornell Lab of Ornithology's All About Birds

National Wildlife Federation Nature Guide Apps

Wildlife Viewing Safety

When viewing wildlife, a good rule of thumb is to use the thumb trick! The Center for Outdoor Ethics Leave No Trace program established this trick to teach us how to respect wildlife when we encounter them in their habitat. To use the thumb trick, "make a thumbs up, extend your arm all the way out, close one eye, and see if you can hide the animal with your thumb." If you have hid the entire animal with your thumb, you are an appropriate distance from the animal. If not, take a few steps back and try again. Check out LNT's video guide here.

Activities

Scavenger Hunts

Overview

A scavenger hunt is an activity in which participants set out to find miscellaneous items. This fun activity can add an element of competition, urgency, and excitement to any event. When used for educational purposes, scavenger hunts allow participants to become more engaged and excited during the learning experience.

A scavenger hunt can motivate participants in a way that they feel compelled to work together, learn, and complete a task. Incorporating a hands-on approach such as this encourages practice of skills such as critical thinking, communication, collaboration, and creativity. With a little research and creativity, a scavenger hunt can be developed for any public land site!

Elevating a scavenger hunt to environmental education involves making connections. What kind of connections? The type of connections that lead to awareness, appreciation, and action. The connections can take the form of clues (e.g. habitat requirements, tell-tale indicators such as scat, etc.) to help locate a species of concern. Or illustrations can be used to assist participants in locating or identifying an item on the list.

Using a theme, whether initially apparent or not, can transform a list of seemingly miscellaneous

Tips for Success

- Incorporate different elements of EE into the scavenger hunt objects and activities (e.g. stewardship, conservation, fun facts, etc.)

- Emphasize that participants should seek and identify objects on the list, but not remove them from their habitat or place in the park. Consider requiring participants take only photos of their finds.

Resources

Habitat Hunt

National Wildlife Federation: Lesson plans

items into a coherent story (e.g. the plight of an endemic species, etc.) or message (e.g. Leave No Trace, etc.) that participants can take with them and act upon. Revealing the theme behind the list can be an impactful way to reinforce learning. Asking participants if they can identify what the items have in common is a great debrief question.

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Real-World Examples

Scavenger Hunt

Scavenger Hunt, Lovers Key State Park, Lee County, FL

For the National Public Lands Day event in 2015, Katie Moses wanted to do something out of the ordinary that would attract a new crowd to Lovers Key State Park. Instead of organizing a workday where volunteers come to the park and trim vegetation from trails or pull an exotic plant, she wanted them to have a little taste of everything, so she organized a scavenger hunt. The family-friendly scavenger hunt was appropriate for individuals of all ages and it incorporated different levels of community engagement. Each of the 18 teams that registered were given a backpack (donated by a local tourist development council) containing plastic bags, gloves, pens, a park brochure, trail brochure, shell brochure, and a booklet with the scavenger hunt tasks. The tasks ranged from simple questions that encouraged participants to see programs that the park features, such as kayaking and fishing, to interactive activities that allowed people to be hands on and enhance the nature of the park. Some of the interactive tasks asked participants to plant a plant along a trail, pick up trash, and identify a butterfly.

Some questions included on this scavenger hunt were: How long is the Black Island Trail? What is the best time to see wildlife? Identify a butterfly you see in the garden: _____. Plant a plant. What was the name of the plant? _____.

Nighttime Activities

Overview

If you live in a very hot part of the country, it may be too hot to engage people during the day in the summer months. Or perhaps you are hosting an after-work event designed to engage working parents and their families. Hosting a community engagement event at night allows participants to experience a public land site in a unique way— the smells, sounds, temperature, and wildlife are different at night. You could have two events at the same location, one during the day and another at night, it would be like exploring two different locations!

Throughout human history people have wondered about the cosmos, especially at night. Up until about 100 years ago, people living in cities could see the Milky Way galaxy arc across the night sky. Today, most people live in cities, so they do not experience pristine dark skies and cannot glimpse the wonders beyond our planet's atmosphere. Why? Light pollution! To extend human activities into the night requires artificial light, which alters the environment and can impact wildlife. This results in consequences such as negatively impacting animal physiology, migratory habits, predator-prey relationships, even disrupting ecosystems, and the very rhythms of life.

Types of nighttime activities

Campfires

Many public land sites have designated areas for campfires. This can be an ideal place to notice and enjoy nocturnal nature. Campfires can also be the perfect time to share conservation stories, lessons learned, or discussions about EE, since everyone is congregated in a circle and surrounded by the nighttime environment. Be sure to follow proper protocol to ensure safety of all participants and the environment. Check out Smokey Bear's campfire rules here.

Night Hikes

Lead a simple walk around the park. At night the park will seem like a completely new experience for your participants. Surrounding streets are quieter. The sounds of wildlife are different. Participants will get a chance to see insects and wildlife that they don't usually see during the day, exposing them to nocturnal species and environmental issues impacting them.

Stargazing

Even without expensive telescopes, an informative astronomy talk is possible. Light pollution and the impact it has on different species—including humans—is a great place to start. There is much that can be learned just from looking skyward at night.
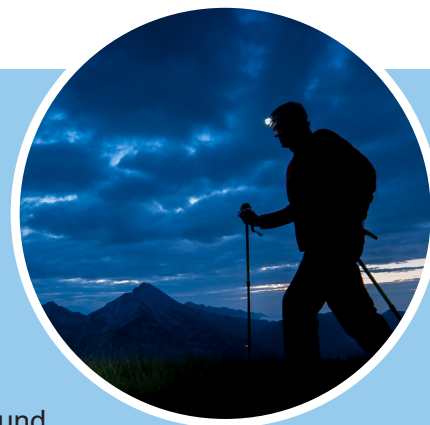
Night Games

Bat and Moth is an EE game most ideally played at night. Participants circle up and hold hands to be the "trees" that surround a meadow. Two volunteers are selected to play the roles of a bat and the moth. To illustrate the concept of echolocation, the bat is blindfolded and claps periodically to locate its prey—the moth claps back simulating bio-sonar.

Real-World Examples

Music Under the Stars

Sagamore Hill National Historic Site,
Cove Neck, NY

Throughout the summer of 2018, Sagamore Hill National Historic Site hosted a series of events called "Music under the Stars." Thanks to the park staff, Hofstra University, and a local amateur observer society, children got to learn about and experience the night sky. Each week, the event started as the sun set. Participants first saw a presentation from a member of the observer society, where aspects of astronomy were demonstrated. Then, children participated in activities under a tent such as planet identification, coloring pages, and constellation matching games. When it was fully dark outside, children went outside and looked through telescopes to study the stars in the sky. The telescopes were provided by the local observer society, and a member of the society stood by each telescope so that they could assist each child in looking through the lens and interpreting what they saw. Some children even got a personal lesson on how to use their telescopes from home from these "amateur experts." This event attracted families throughout the summer, some bringing picnic blankets and dinner to picnic under the stars. Through the activities and educational opportunities at this event, Sagamore Hill hopes that people begin to see the night sky as its own element that must be protected against pollution. They also hope that participants will discover and fall in love with the night sky as a recreational opportunity.

Tips for Success

- Providing "What to Bring" and "What to Wear" lists with everything from reflective vests to headlamps will help ensure that everyone will be able to see and be seen.
- When facilitating outdoor activities at night, be sure to hold them in areas without hazards to help ensure participant safety.
- Appoint a hike leader and a group sweep for night hikes to help ensure no one gets lost.

Resources

Night Hike Lesson Plan

Night Hike Scavenger Hunt

Technology-based Activities

Overview

There's no question that technology has become a part of almost every aspect of our daily lives. From social media and work, to entertainment and news—many people spend hours each day glued to their screens. But not all screen time is bad. Recent developments in technology are helping us interact with nature like never before! With a standard smartphone you can take a photo of a leaf and get instant identification using apps like Leafsnap and SEEK by iNaturalist, carry hundreds of field guides in your pocket using Audubon's apps, identify wildlife tracks using MyNature Animal Tracks, and become a pro birder using a variety of different birding identification apps like eBird.

On the next page is a list of tech-based activities that are designed to encourage people to get outside and connect with nature!

Leafsnap

is a series of electronic field guides being developed by researchers from Columbia University, the University of Maryland, and the Smithsonian Institution. The free mobile apps use visual recognition software to help identify tree species from photographs of their leaves. They contain beautiful high-resolution images of leaves, flowers, fruits, petioles, seeds, and bark.

Agents of Discovery

is an educational mobile gaming platform that connects people to nature in their communities through engaging augmented reality experiences designed to heighten conservation awareness and increase visitor enjoyment of public spaces. In 2018, NEEF leveraged AoD to engage volunteers in environmental education during National Public Lands Day events.

Pokémon Go

is a mobile game that involves augmented reality to deliver a real-life Pokémon experience. This allows people to capture their favorite Pokémon in the real world using the same technology Google Maps uses. This application has been used by many federal land sites—most notably the National Mall, which used Pokémon Go to get new audiences to their parks. Once the visitors were in the parks, rangers were on-site to provide interpretive information.

Real-World Examples

"Catch the Mall" Pokémon Go
National Mall, Washington, DC (source)

In 2016, park ranger Paul Ollig noticed several of the visitors at the National Mall were focused on cartoon animals on their phones rather than the monuments. He discovered that people of all ages were drawn to the National Mall to play Pokémon Go, an augmented reality game that uses the player's smartphone, camera, and GPS to overlay fictional characters over the user's real-life surroundings. Users were particularly drawn to the National Mall, because the area and historic landmarks were hotspots of activity in the game. Ollig recognized the educational potential and created a park initiative called "Catch the Mall," a play on the game's motto "Gotta Catch them All." The National Mall quickly began offering ranger-led Pokémon Go tours, with as many as 200 participants. Park rangers that led these Pokémon "hunts" met at different locations around the mall and explained the history of the monuments, while also engaging the crowd with the Pokémon game. Other federal agencies have jumped on the Pokémon bandwagon, creating online guides connecting the app with wildlife (US Fish and Wildlife Service and US Department of Interior).

Bioblitz

Kaibab National Forest, Arizona (source)

During the 2017 calendar year, the Kaibab National Forest hosted a year-long bioblitz to document as many flora and fauna as possible. Visitors snapped photos of plants and animals as they enjoyed the forest, and uploaded those photos and their locations to iNaturalist, a free app that documents observations of living things all over the world. After photos were uploaded, a community of experts, including US Forest Service staff, helped identify what was captured in the picture. "The Forest Service benefits in so many ways from this project, like getting amazing photos for educational materials and identifying management issues," said Natasha Kline, forest biologist for the Kaibab National Forest. "For example, it's really important for us to get pictures of invasive plant species. Staff might want to go out and take a look to see if we need to deal with it right away." The project is also documenting the abundance and distribution of rare species. The location of rare species isn't something they want to advertise because it could put the species at risk. The app iNaturalist takes care of that by adjusting the location and making it clear that the place displayed isn't exactly where the photograph was taken. The Kaibab citizen science project brings together experts who can identify and discuss the species observed in the photographs. Over 100 people were involved in the project, including students at Williams Middle School. Since the school is located within forest boundaries, observations made on school grounds were added to the Kaibab project.

Tips for Success

- For an app or mobile game that requires a data connection, try to test with multiple cell provider networks before holding the event so that if one provider doesn't work very well in the area where you're holding your event, you can give participants a heads-up.

- If it's a mobile game that takes a while to play, consider having a couple chargers or battery banks available for participants to use in a pinch.

Resources

GPS Hide & Seek

Agents of Discovery New Agent Manual

MyNature Animal Tracks

SEEK by iNaturalist

Leafsnap

Audubon Bird Guide App

SunWise

Overview

With one in five Americans developing skin cancer in their lifetime, education about sun safety is a vital step toward reducing risk and enjoying the outdoors safely. While some exposure to sunlight can be enjoyable, too much can be dangerous. Overexposure to ultraviolet (UV) radiation in sunlight can result in a painful sunburn; which can lead to more serious health effects, including skin cancer, premature aging of the skin and other skin problems; cataracts and other eye damage; and immune system suppression. The good news is that UV-related health effects are largely preventable by instituting sun-protection practices early and consistently.

NEEF's SunWise program raises sun safety awareness and fosters behavior change among all individuals. The SunWise Tool Kit provides adaptable activities for individuals of all ages to explore, assess, and understand their natural environment and the factors that affect their health. It is a great way to encourage spending quality time in nature while protecting yourself from UV radiation.

SunWise isn't just for traditional educators—parents, caregivers, and other informal educators can join the Sunwise Program and receive the free tool kit with over 50 cross-cultural, standards-based activities. The program is a free environmental and health education program to teach individuals about sun safety, UV radiation, and stratospheric ozone. Read below to learn how your organization can incorporate SunWise activities into your next community, school, health fair, or corporate event and encourage individuals to be physically active, while protecting themselves from UV radiation at the same time.

Real-World Examples

2019 Walk to Wellness

Washington, DC

The US Environmental Protection Agency co-sponsored an annual Walk to Wellness to engage and energize federal agency employees to strive for a healthier work-life balance. The Walk to Wellness is an outdoor event that includes fitness center class demonstrations such as Zumba and kickboxing; music; a walk around the neighborhood; and sports competitions such as hula hoop and football toss.

The National Environmental Education Foundation was invited to promote the SunWise program. One of the featured activities, *UV Frisbee Science,* showed participants the effects of UV radiation and the effects of different materials on blocking out UV radiation. The activity used three UV Frisbees each covered with either baby oil, cotton cloth (t-shirt), or broad-spectrum sunscreen (with SPF 30 and above). Participants recorded observations after each Frisbee was exposed to direct sunlight. After completing the activity, participants described ways they can protect themselves against harmful UV radiation and indicated behaviors they intend to change to be SunWise.

Detecting UV Light Using Tonic Water is an activity that demonstrates the presence of UV light in sunlight. When a photon of UV energy is absorbed, it is re-emitted by the quinine in tonic water as a photon of visible light. This process is called fluorescence. The amount of fluorescence that occurs is influenced by the amount of UV radiation to which the tonic water is exposed. This will reinforce the concept that UV radiation is always present in sunlight—even on a cloudy day—although invisible to the naked eye. After seeing the tonic water demonstration, participants discussed the observed phenomena.

Tips for Success

- If possible, make available giveaways and free samples of broad-spectrum sunscreens. Contact NEEF for information on procuring UV beads.

- On overcast days carry on with activities. Remember UV rays are present even when there is limited sunlight.

- Long sleeved shirts, pants, and hats can be used to protect people from UV radiation.

- Use a UV lamp to take this activity indoors.

Resources

FREE SunWise Activities

Learn More about UV Radiation

Action Steps for Sun Protection

Recycling/ Composting/LNT

Overview

Trash, or waste, is an inescapable part of our lives. It is relatable, familiar, and the source of many environmental problems all over the world. Proper waste management and trash disposal are an easily teachable and understandable topic of environmental education lessons. Public lands serve as the ideal classrooms for these lessons because it is very clear to visitors of parks what is natural, and part of the surrounding ecosystem, and what is not.

Many community service or community engagement events on public lands include clean-up or beautification projects, which present the perfect opportunity for an educational lesson on proper waste management and disposal. Lessons about waste disposal can include topics such as anti-littering, proper recycling, how to compost, impact on ecosystems, and more.

The Leave No Trace Center for Outdoor Ethics has led the effort in this type of EE by delivering cutting-edge education and research to the public about how to protect the outdoors and by inspiring people to enjoy it responsibly. With their work, they hope to address environmental problems, such as trashed natural areas, polluted waters, damaged, trails, and more.

7 Principles

Leave No Trace hopes to minimize human impact on the environment through their 7 Principles:

1. Plan Ahead & Prepare

2. Travel & Camp on Durable Surfaces

3. Dispose of Waste Properly

4. Leave What You Find

5. Minimize Campfire Impacts

6. Respect Wildlife

7. Be Considerate of Other Visitors

Learn more about LNT here: https://lnt.org

Real-World Examples

Compost Fair
Tompkins County, NY

For 25 years, Tompkins County has held an annual, spring compost fair. In the most recent years, they have teamed up with local 4-H Development to hold the educational event with their Duck Race—an annual spring fundraiser which features thousands of yellow ducks that race down the creek. At the Compost Fair, "Master Composters" who are just about to finish their 10-week training, plan fun and educational booths about different aspects of composting. Some cover the basics like what attendees can compost at home, and why composting is an important practice, while others focus on advanced compost practices, such as: indoor vermicomposting, making and using compost tea, and the biology/ecology of the compost process. The event also features a stage where a variety of performers entertain the audience and convey messages about composting and waste reduction. In addition to the compost-themed acts, the fair attracts a variety of other music, theatre, and dance acts. The goal is to celebrate spring's arrival, have a good time, and get ready for the growing season by sharing information about composting.

Resources

[Tread Lightly!](#)

[LNT Activities and Games](#)

[LNT Bigfoot's Playbook](#)

[Recycling Olympics](#)

[Trash Dash](#)

Fairs/Tabling

Overview

As public lands are easily accessible to large numbers of people in communities, they are great places to hold events for the whole community. With many people in attendance, it is the perfect opportunity to set up exhibits or learning stations covering a variety of topics with information for attendees take home. Whether you want to put together an entire event focused on environmental education or a specific topic, or incorporate tabling into your already existing event, this is an excellent way to include several topics or areas of focus at a glance for the public to learn about.

Incorporating tabling into your event

If you are planning an event on your public land, such as Earth Day, a community clean up, or National Public Lands Day, consider designating a small area for tabling. This allows for micro-environmental education experiences that your event participants can engage with before, during, or after your event.

With the primary focus being the main event, focus on adding tables that will enhance the experience for your participants by providing relevant background or supplemental knowledge. For example, if you are holding a community restoration event to clean up and restore native vegetation, you could invite groups or organizations to hold tables for topics such as local native species, watersheds, and wildlife. Reach out to local wildlife or conservation groups, professional societies, nonprofits, organizations that focus on educational outreach, and small businesses.

Planning an educational fair or event day

You can also host an event on your public land with the intention of opening up the space for the community to gather and visit the tables of local groups and organizations. Here, you can invite a variety of local groups and organizations to participate to give your event participants a well-rounded EE experience. You can host your event around a holiday or event, such as Earth Day or a significant celebratory occasion to your community, such as a park's birthday.

Real-World Examples

Water Quality Fair
Hogle Zoo, Salt Lake City, UT

In April 2019, dozens of teachers, chaperones, and 3,000 fourth grade students from throughout Salt Lake County gathered at Hogle Zoo for the 13th Annual Salt Lake County Stormwater Coalition Water Quality Fair. The purpose of the annual water fair is to help students to learn about the water cycle, stormwater pollution prevention, how water quality impacts health, the environment, and quality of life, and experience the relationship between water and zoo animals. While at the zoo, students circulated among 13 learning stations that supported the 4th grade science core curriculum. Exhibits and learning stations included: Vactor Truck, Street Sweeper, Stormwater Bean Bag Toss, SLC interactive Water Shed, Tracy Aviary, Stream Trailer, Safe Kids/Water Safety, Droplet Booth, We All Live Downstream, Back Flow Prevention, Dr. Strangewater, and Water Cycle. The annual event is hosted by Hogle Zoo and sponsored by the Salt Lake County Stormwater Coalition, which is made up of water professionals and public works departments from Salt Lake County and every municipality within the county, SL County Health Department, and Utah Department of Transportation.

Resources

[Earth Day Action Toolkit](#)

[Earth Day Plan a Digital Event](#)

Citizen Science

Overview

Citizen science is the practice of engaging the public in scientific research. Through citizen science projects, people voluntarily collect and analyze data for use in ecology and climate research programs over regions and timelines greater than formal scientists can achieve on their own. Researchers often create a citizen science project to capture more frequent or more widely spread data without acquiring additional funding. They often work with community groups that are already collecting such information, such as birders, to expand their research studies and databases.

Volunteers generally have varying levels of expertise, from kids in their backyards to members of high school science clubs to amateur astronomers with sophisticated home equipment. Modern advances in technology make participating in citizen science more accessible today than ever before. The success of any citizen science project depends on the establishment of a well-devised monitoring program, thorough volunteer training, robust data collection protocols, and the dedication of its volunteers. Citizen science initiatives can be incorporated into public lands either by contributing to already existing citizen science programs or by building your own.

Becoming part of an existing citizen science program

It is easy to get involved with existing citizen science programs. There are online databases that allow you to find ongoing citizen science projects that contribute to science on a species, ecosystem, national, or even international level!

Log information about species across the nation and world:

http://inaturalist.org/

https://ebird.org/home

https://journeynorth.org/

https://observer.globe.gov/about/get-the-app

Databases you can use to identify citizen science projects:

https://scistarter.org/

https://www.projectnoah.org/missions

https://www.citizenscience.gov/catalog/#

https://www.citsci.org/CWIS438/Browse/Project/
Project_List.php?WebSiteID=7

Creating a new citizen science program on your public land

If your public land or surrounding community would like to conduct some research, you may consider making it a citizen science project so that members of your community can be engaged and assist with data collection. With sufficient planning and advertising, your citizen science project can be a great success! We found some resources that can help you get started:

The Librarian's Guide to Citizen Science

US Forest Service: Citizen Science Toolkit

The Citizen Science Manual

NEEF: Surrounded by Science Educator Toolkit

Tips for Success

Training is key to your citizen science program's success! Try to include initial volunteer training, as well as refresher training for returning volunteers so that everyone collects accurate data.

Reference material/suggested reading

Basic Steps for Your Project Planning by citizenscience.gov (toolkit)

Book: Learning through Citizen Science

Real-World Examples

Alaska Bat Monitoring Project

Tongass National Forest, Juneau, AK (source)

The Alaska Bat Monitoring Project was created in 2014 by the Alaska Department of Fish and Game and is supported by the USDA Forest Service. The project has been able to collect substantial data on bats in Alaska with the help of citizen scientists conducting driving surveys in Ketchikan, Cordova, Haines, Petersburg, and Sitka. Much is unknown about bats in southeast Alaska, and researchers hope to use the volunteers' data to inform forest management. The surveys this past winter focused on better understanding where these bats hibernate.

Volunteers driving along their assigned transects collect this much-needed data. Their recordings allow researchers to identify specific species of bat based on the frequency of their call. With the help of citizen scientists, land managers can be armed with the knowledge necessary to understand bat population and habitat changes and take actions to ensure they continue to thrive.

Citizen Science Oyster Monitoring

John D MacArthur Beach State Park, Palm Beach County, FL

This National Public Lands Day event at John D MacArthur Beach State Park engaged the local community in oyster monitoring research. The event began with a presentation from guest speaker, Dr. Susan Laramore about oyster and sea grass restoration initiatives in South Florida. Dr. Laramore taught participants how oysters and sea grasses help create a "living shoreline." With this background information, participants understood the context of the citizen science research that they were going to help collect. Next, they headed into the estuary to help complete a biological survey of oysters in the park. Participants were hands-on, collecting scientific data about the number and health of oysters. This information collected by event participants will potentially be used to inform future restoration projects.

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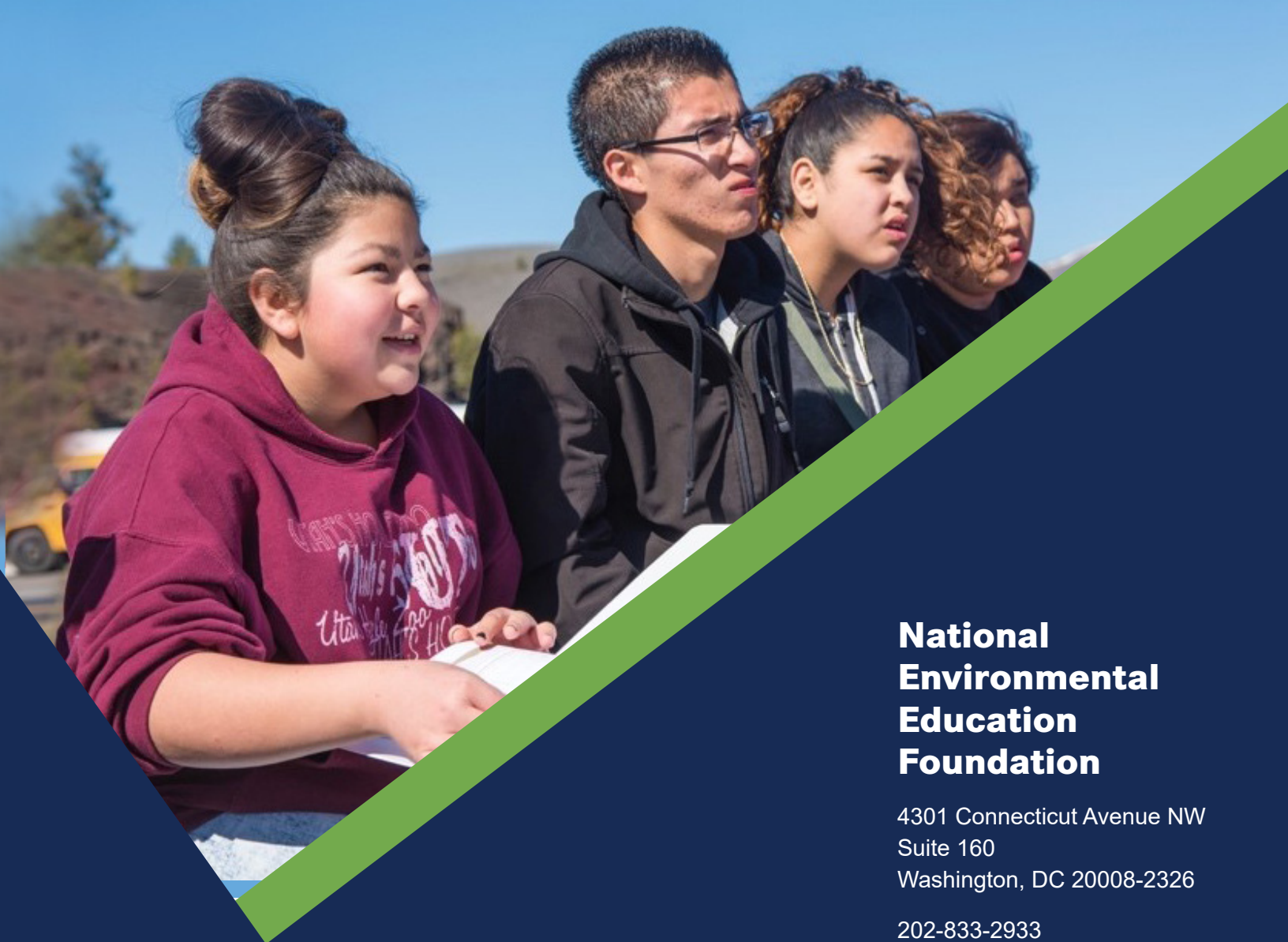
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