

A Guide to Outreach: Engaging the Public with Paleontology



Paleontological Society
Education and Outreach Committee



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Why Do Outreach?

Communication is an essential component of scientific practice. As paleontologists, we share our research with our colleagues in the form of conference talks, posters, and published papers. If we teach at the college or university level, we also communicate with our students, conveying information about the fossil record and the history of life on Earth as well as how paleontologists investigate our ancient past.

However, another audience for our expertise exists: the children, teachers, parents, and members of the general public who are fascinated by fossils and what they can tell us about our planet. Outreach to these groups can expand minds, promote the science of paleontology, and perhaps change a child's life. When we communicate what we do as paleontologists and what fossils reveal about the past to the public, we are shaping our future scientists and creating advocates for our discipline.

Outreach activities can take many forms, from a formal presentation in an elementary school classroom, to a show-and-tell with a Girl Scout troop, a fossil identification day for the general public, or a science night at the local café. We are fortunate that paleontology is extremely popular among young and old alike, with media outlets reporting nearly every week on a new fossil find or discovery. This media coverage keeps our field in the public's mind. And kids' natural curiosity and enthusiasm, combined with a few fossils, can be all that's needed to shape a meaningful outreach experience.

This short guide will help you plan your own outreach efforts, from identifying key ideas to include to finding a venue and developing a specific activity. Bringing paleontology to new audiences can be tremendously rewarding for you and have a real impact on your participants. It's also great fun! We hope you will be inspired to get out there and share your love of paleontology!



Essential Concepts in Paleontology

It is worth considering what ideas in paleontology you want to convey in your outreach efforts. Many teachers seek out outreach opportunities for their students that reinforce the essential concepts mandated by state education standards. While standards vary from state to state and by grade level, common paleontological concepts students are expected to learn include:

- Fossils provide evidence of ancient organisms and of the environment in which they lived.
- We can use what we know about living organisms and modern environments in order to understand ancient organisms and environments.
- Fossils provide evidence for evolution—the idea that all life is related and has changed over time.
- Fossils help show that ecosystems have changed over geologic time.
- Species eventually become extinct. Extinction is often caused by changes in Earth’s environment.
- Different time periods in Earth history are characterized by different types of fossil organisms.
- Fossils can be used to date and correlate rocks.
- Fossils provide evidence of ancient plate tectonic motions.
- Fossils show that life arose on Earth early in its history, about 4 billion years ago. For much of Earth history, only single-celled life was present on Earth.



When planning an outreach activity for kids, consider focusing on one or more of these essential concepts. And check with the teacher, librarian, or youth group leader with whom you’ll be working to see whether there are specific ideas about fossils he or she would like you to reinforce.

While there’s no set curriculum for grown-ups, it’s often helpful to identify a few key ideas you want to convey to a public audience as well. These ideas can shape and focus your efforts and ensure the audience leaves with a better understanding of core principles in paleontology.

Finding an Audience

So, you are convinced of the importance of outreach and have some great ideas of how you could share your experience and enthusiasm for paleontology with non-specialists. But now what? How do you find an audience willing to listen to you?

As it turns out, those audiences are already out there and clamoring for you! A simple phone call or email to your local school, public library, or senior center offering to come in and talk about fossils for an hour may be all you need to do to arrange a fantastic outreach experience.

Some common audiences for paleontological outreach include:

- K-12 schools and preschools
- Teacher professional development workshops
- Scout troops
- 4H Clubs
- Boys and Girls Clubs
- YMCAs/YWCAs/JCCs
- Public libraries
- Parks and other recreational facilities
- Senior centers
- Amateur fossil and rock clubs
- Science Cafés and Pub Nights
- Alumni groups
- Church groups
- Rotary Clubs and other community service organizations



Consider what age group you'd like to work with. Think little kids are great fun? Call or email your local elementary school or scout troop. Rather meet with adults? Your local Science Café, amateur club, or community service group may be a better choice for you.

Besides these groups, other outreach opportunities may exist in your neighborhood. Local universities, museums, zoos, and science centers may have special events, like campus science days for K-12 students, public lecture series, or “a night at the museum” events, in which you could participate. Just give them a call or search their website for an event calendar. Regional science fairs often include a keynote speaker or two. County fairs, art shows, even the local shopping mall may be happy to give you a table to show off some fossils and help people identify their own. Opportunities to talk with an audience are everywhere.

One way to pitch your outreach program is to tie it to a national or international event. Many institutions host “Darwin Day” events around Charles Darwin’s birthday (February 12), which are natural venues for talking about how evolution is studied in the fossil record. National Fossil Day, sponsored by the National Park Service, occurs every year in mid-October as part of Earth Science Week. Check with your local park to see if they have any Fossil Day events planned—if not, offer to organize one for them.

In any case, the first step is to make that phone call or send that email. Explain who you are and that you’d be happy to speak to the group about paleontology, bring some cool fossils for the audience to see, help identify fossils the public brings in, or whatever else you feel comfortable doing. The next section of this guide offers some examples of outreach activities you can try.



Sample Activities

You can design your outreach activities in a variety of ways, depending on your audience, how much time you have, what fossils and other resources you can bring with you, your own research interests, and your personal comfort level.

Most importantly, realize that while our labs and offices are often full of fossils, most schools have no real fossils to show kids and adults may have never seen one. Even some scruffy looking brachiopods can be fascinating to your audience!

Here are some sample activities to get you started.

Fossil Show and Tell

Time Needed: 30-60 minutes

What to Bring: Sturdy hand samples of fossils that can be picked up and passed around; optionally, samples of living groups to pair with your fossils (*e.g.*, modern and fossil snail, sea urchin, coral, etc.)

What to Do: Introduce yourself and explain a bit about what your job as a paleontologist is like.

As you pass around the fossils, engage the audience by asking questions and discussing their responses. Some good questions to get you started are:

- Who can tell me what a fossil is?
- How old are fossils?
- Where do we find fossils?
- How do fossils form?
- What parts of an organism can fossilize?
- How would a bone, tooth, or shell get into a rock?
- Can plants become fossils?
- Why do fossil corals [or other group you have on hand] look a lot like modern corals?
- Have you ever found a fossil?
- Why study fossils?
- Who studies fossils?
- How can fossils tell us about ancient Earth?
- What questions do you have about fossils and paleontology?



Investigate Your Fossil Find

Time Needed: 45-60 minutes

What to Bring: Enough small fossils for each participant or pair of participants to have one—all the same type of fossil or several different kinds; or use photographs of fossils; paper and pencils if not provided; optionally, small magnifying glasses and rulers

What to Do: Introduce yourself and explain a bit about what you do as a paleontologist. Tell the participants that today they get to be paleontologists—people who study fossils to learn about ancient life. Ensure that everyone understands what a fossil is. Explain that the first step in studying a new fossil is to observe it carefully and describe it. This way, the paleontologist can identify the important characters of the fossil that determine what kind of animal or plant it is.

Distribute the fossils to each participant or pair of participants. Tell them to first look at the fossil very carefully. What can they see? What can they feel? Direct the participants to draw two views of their fossil, one from the top and one from the side. Ask participants to indicate how big their fossil is on their drawing. Next, have participants write out a description of their fossil, highlighting key details they think are important.

While they are working, circulate among the participants, asking them to tell you about their fossil. What have they observed? What sort of organism do they think it is? Is the entire organism there? What's missing? Does it look like something alive today? Where do they think it lived—in the ocean, on land, in a lake? What other organisms might have lived with it? How old do they think it is? Do they think it's extinct? Answer any questions they have about their fossil.

Now have participants form groups of 2-4 and compare what they have found out about their fossil. Let them teach each other about their fossil find.

Finally, bring the whole group back together. Have a few participants share what they've learned about their fossil. Emphasize how much we can figure out about ancient life by just carefully observing fossil specimens and using what we know about living organisms and ecosystems. Conclude with an open question and answer period.

Your Neighborhood in Deep Time

Time Needed: 45-60 minutes

What to Bring: Locally collected fossils or fossiliferous slabs; or images of locally collected fossils; images that show modern ecosystems and modern day environments that are similar to what your location's ancient ecosystem was like (*e.g.*, a coral reef, sandy shoreline, tropical forest, grassland, etc., as appropriate); some printouts or a digital image of a geologic time scale.

What to Do: Introduce yourself and explain that, as a paleontologist, you work to reconstruct what Earth's ecosystems were like in the past.

Ask participants to describe what the local ecosystem is like today. Then ask them whether they think it has always looked like that. Discuss their responses. Why do they think one way or another? How do scientists actually figure out what ancient Earth was like?

Next, provide the participants with some locally collected fossils (or images of them). You might give them a timescale and tell them the age of the fossils, or hold off until they've investigated the fossils on their own.



Have them work in groups to examine the fossils and brainstorm possible ecosystems in which such organisms might have lived. Each group should try to decide on a single most likely ecosystem.

When every group has come to a conclusion, have them report out their idea and why they decided on that particular ecosystem. Did the groups all come up with the same ancient ecosystem?

Conclude by revealing the correct ecosystem – what did their neighborhood look like millions of years ago?

Leave some time for general discussion and questions.

Fossil Identification Table

Time Needed: 1-4 hours – Note that you will need to advertise this opportunity for the public to get their fossils identified by an expert ahead of time!

What to Bring: Yourself and some student volunteers; some hand samples or photos of local fossils; guidebooks and identification keys for local fossils (check with your state geological survey for resources); your business card for follow-up questions; signage to indicate the purpose of the table



What to Do: Set up a table with sample fossils, images, and guidebooks. Engage participants by offering to identify their fossils for them. If passers-by don't have their own fossils, offer to explain a bit about local fossils and collecting sites.

Career Day

Time Needed: 30-60 minutes

What to Bring: Yourself; optionally, some fossils to pass around (perhaps ones that you use in your own research); images of your lab, field sites, etc.; web link to a paleontology careers site (the Paleontology Portal and Museum of the Earth have good careers pages: <http://www.paleoportal.org> and <http://www.museumoftheearth.org>)

What to Do: Introduce yourself and explain what your current job is.

Explain in general terms what a paleontologist does, while passing around the fossils, if you brought them.

Talk about what first got you interested in science and in paleontology in particular.

Describe the pathway you took through school into a career as a paleontologist.

Tell stories about your adventures and challenges as a paleontologist.

Talk about what you do in a typical work day.

Give your audience plenty of time to ask you questions about what you do and how you got there.

These sample activities show just a few ways to get your audience thinking about paleontology. Feel free to embellish or modify them to fit your style, your audience, and the resources you have available to you. And invent your own outreach activities. Think about what got you excited about fossils and be creative!



A Note About Media

This guide has focused on face-to-face outreach activities. Both old and new media provide a different sort of platform for you to engage the public.

If you are interested in going this route, be sure your local television and radio stations and newspapers know that you—a real, live paleontologist—are in the neighborhood and willing to be interviewed about paleontological news items. Ask your institution's public relations office (*i.e.*, the office that issues press releases for your institution) to add your name to their list of topical experts.

Consider wading into the world of social media by blogging, tweeting, or otherwise communicating about your own research and the world of paleontology in general in online venues. Upload videos and photos of your field work to social media websites like YouTube and Instagram and encourage your friends and family to share them with their own social media circles. Use the internet as a tool to expand the reach of your outreach efforts.



Resources to Support You

Websites:

The Paleontological Society (check out our educational activities and fossil brochures)
<http://paleosoc.org>

The Paleontology Portal (a clearinghouse of educational resources and information)
<http://www.paleoportal.org>

University of California Museum of Paleontology's Understanding Evolution site
<http://evolution.berkeley.edu>

National Fossil Day
<http://nature.nps.gov/geology/nationalfossilday/>

International Darwin Day
<http://darwinday.org/>

Science Cafes
<http://www.sciencecafes.org/>

The FOSSIL Project (includes a national directory of amateur fossil clubs)
<http://www.myfossil.org/>

National Center for Science Education
<http://ncse.com>

Funding Sources:

The Paleontological Society provides support to our members for community engagement and educational outreach through a competitive grant program. Learn more about the PS Outreach and Education Grant at the Society's website: <http://paleosoc.org>.

Your own institution may offer small grants to offset costs associated with public outreach by its employees. Check with your Dean's or Provost's office.

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