



# Science Communication Workshops

**A Guide for Facilitators**

## Acknowledgements

We are grateful to the many interpreters, scientists and resource managers who have made park-based research a lively, interactive part of park visitors' experiences. We are thankful for Park Service staff who have advised the iSWOOP project, and to the National Science Foundation for its support.



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For more information about the project, go to <https://www.terc.edu/iswoop/> and <http://www.iswoopparks.com/>

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## Here's to You, Facilitators!

Science communication in parks and on protected lands belongs in every staff member's job description and therefore is sometimes pushed to the side because surely someone else is attending to it. You are stepping up to make sure that interpreters have the background they need to interpret the science going on behind the scenes. Thank you! You are carrying forward some well-tested ideas from the iSWOOP project (Interpreters and Scientists Working on Our Parks). In this guide, you'll find instructions for facilitating workshop sessions and also some background on iSWOOP so you can explain how iSWOOP dovetails with National Park Service (NPS) goals to advance science learning and communication.

**4 Days??!!** As written, the sessions take place over days. Feel free to adapt the sessions described. Ideally interpreters will have time for hands-on work with a featured scientist and time to begin to flesh out ideas for formal and informal interactions. As you plan, take into account factors like scientists' availability, interpreters' familiarity with the science, and the time staff need to practice with new display devices.

### iSWOOP Background



iSWOOP stands for *Interpreters and Scientists Working On Our Parks*. The project was funded by the National Science Foundation as a way to increase STEM (science, technology, engineering, and math) learning opportunities among national park visitors. iSWOOP brought scientists and NPS interpreters into direct contact so that interpreters could bring visitors into the loop on the science research underway on park lands. "iSWOOP" is often used as shorthand for giving interpreters and visitors an opportunity to see science behind the scenes, an aspect of parks that is not usually visible.

Communicating science in parks is not new. What makes iSWOOP different? We spell this out on p. 4, and there is more backstory and talking points in the guide, "Getting Started with iSWOOP".

- Showcase science happening behind the scenes. Visitors are often surprised there is active research;
- Make prominent stories of daunting challenges scientists face, breakthroughs, and more;
- Showcase science happening in national parks. Increases visitors' science literacy, sharing *how* we know what we know;
- Capitalize on visitors' interests;
- Increase visitors' visual literacy, by inviting visitors to observe, predict, and speculate;
- Make research prominent through the use of still images, video, and other visualizations.

For a visual, see page 3, with project components and expected outcomes. Page 3 also summarizes how iSWOOP's approach is compatible with 21st century standards.

Visual literacy is often defined as the ability to interpret, use, appreciate, and create visual media to advance thinking, decision making, communication and learning. If you don't like this definition, read around. There are others.

## Why do it?

iSWOOP enriches visitors' experience at parks by giving them another way to form emotional and intellectual connections with the resource—through stories about research, gaining insight into new technologies, and considering the relevance of park-based research. iSWOOP can be a vehicle for achieving the recommendations contained in the NPS publication *Call to Action* and other reports.

- One of the key goals identified in the *Natural Resource Challenge* (1999) articulated the responsibility of the NPS in science communication: “Knowledge gained in national parks through scientific research is promulgated broadly by the National Park Service and others for the benefit of society.”
- In 2009, the National Parks Science Committee observed, in *National Park Service Science in the 21st Century*, that, “each national park should serve as a center of enlightenment. . . . As stewards of the parks, the National Park Service has a unique opportunity to improve the scientific literacy of the citizens of this nation and help foster a national stewardship ethic.”
- The *Call to Action* (2011) asserts, “the NPS role as an educational force based on core American values, historical and scientific scholarship, and unbiased translation of the complexities of the American experience.”

Need more talking points? Check the iSWOOP website for Getting Started with iSWOOP. Check out the evaluation report on available on the project website.

## iSWOOP's Approach Dovetails with 21st Century Standards

The way iSWOOP approaches science communication is compatible with 21st century standards and audience-centered interpretation. For example, interpreters demonstrate:

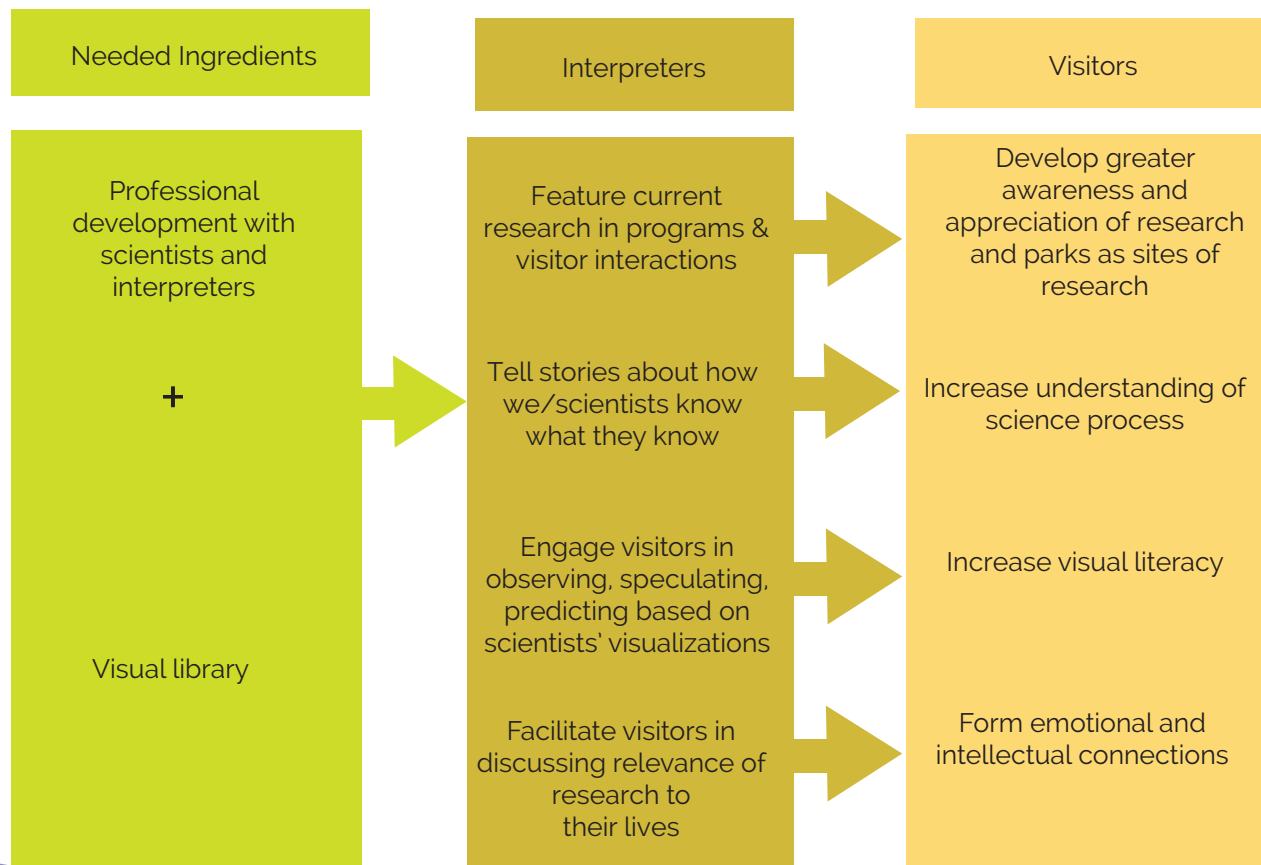
### Knowledge of Audience and Embrace Multiple Engagement Strategies

- Balance the amount of “broadcast” and “listening” time to facilitate visitor engagement and expression of knowledge
- Respond to audience input, allowing experience to evolve based on audience motivation, audience input, and reactions
- Encourage audience members to build on each others’ ideas and perspectives

### Knowledge of On-Site Resources, Research and Current Context

- Incorporate current scholarship, giving the research a frame or context related to the meanings of the resource
- Engage visitors in learning about science research
- Share details or broad purpose of the scientific research being conducted at the park
- Position self and audience as learners and stakeholders in research, its questions, challenges, innovations and applications

## What iSWOOP Is: Program Components and Expected Outcomes



## What iSWOOP Is and Is NOT

Parks get at science in many ways, through signs, social media posts, talks and walks, and even apps that help visitors identify species or contribute data to a study. iSWOOP is distinct from other science-based interpretation currently happening in parks.

iSWOOP Is ...	iSWOOP Is Not ...
Personal and interactive: an approach to personal interpretation that makes science in parks an interactive and visible part of the public's park experience	Primarily using waysides, social media, exhibits, or print media to showcase park-based science
Audience-centered, two-way conversations that allow time for visitors to engage with each others' ideas	Information out
A way to talk about science as a process that starts from questions, involves revision, and has the potential to matter to all of us	A way to remind visitors that science is largely a collection of facts about how the world works
Science in parks is inherently interesting and full of good stories--both first person from interpreters' experiences and about the researchers and what they are studying	Facts strung together and offered in an engaging way
Technology and innovative methods that are key to understanding how we know what we know	Facts shared without attention to who figured it out and how
Images that are sequenced to reveal something about the resource, but also as a starting point for inquiry and discussions of relevance	Images primarily shown to illustrate a place
Programs, formal and informal, that invite visitors to predict, observe, and speculate	A replacement for the strategies and know-how interpreters possess already
Comfortable with silence and reflection	Pre-scripted and pre-determined
Possible because interpreters and scientists spend time together in the field and in the classroom	Minimal or limited direct contact between interpreters and scientists, such as a 1 hour bag-lunch or a field work encounter without follow up

Check [www.terc.edu/iswoop](http://www.terc.edu/iswoop) under Resources for Getting Started for examples of iSWOOP-influenced stationed interpretation, roves, talks, hikes, and evening programs.



## Orientation to the Manual

In this guide you will find detailed session plans. Supporting materials can be found in the appendix. You will need a collection of visuals to run some of the activities. A packet for participants includes helpful worksheets and background. Since it is designed to serve individual interpreters who are integrating park-based science into their practice on their own, if you are facilitating a park-based initiative which has already established a relationship with a scientist, materials on finding cool science and approaching a scientist can be skipped. On the next page, you will see an overview of the four sessions with objectives and activities. Each session has a focus.

Session 1, **Questions and Techniques / Getting to Know iSWOOP**, offers participants the chance to:

- Share questions they have and that they hear visitors express about the topic
- Discuss research questions, methods, process, and findings with scientists
- Experience techniques for advancing (STEM) learning, including questioning, science storytelling, and sparking conversations with scientists' visualizations

Session 2, **Doing Science Together**, offers participants the chance to:

- Consider and discuss the science messages that are at iSWOOP's core
- Continue discussions of research questions, methods, process, and findings with scientists
- Acquire/accumulate personal connections to park-based research through first-hand experience with researchers' methods and technology in the field work

Session 3, **Thinking through Possibilities**, offers participants the chance to:

- Gain experience with the visual library
- Begin planning interpretive programs
- Incorporate feedback, for example, on storyline, visual storytelling
- Reflect on implications for interpretive programs, personal professional learning and the potential for visitors' learning

Session 4, **Interpretive Sketches**, offers participants the chance to:

- Review expectations
- Lead a short segment of an interpretive program or informal interaction
- Give feedback on others' interpretive program segments

Icons may help you plan and run the sessions smoothly.



VISUAL AIDS to be created and posted.



ANOTHER IDEA, options for substituting, altering, or expanding on activities.



This symbol means refer to the PARTICIPANT PACKET. In the Facilitation Steps, items/sections from the Participant Packet are in **bold italics**.



NOTE TO FACILITATOR



Recommended READINGS. In the Facilitation Steps, the names of the readings are in *italics*.



SCIENTIST/RESEARCHER leads this or takes an active role here.



SLIDES or LINKS to share.

## Overview of the iSWOOP Professional Development Sessions

Session 1 Sci Comm Goals, Questions and Techniques	Session 2 Doing Science Together	Session 3 Thinking through Possibilities	Session 4 Interpretive Sketches
<b>Objectives--Participants will be able to ...</b>			
<p>Explain scientists' research questions, methods, and findings</p> <p>Relate their own and visitors' questions to the scientists' area of study.</p>	<p>Represent the research based on first-hand experiences.</p> <p>Gather details for stories, e.g., about the researchers' struggles</p>	<p>Plan and practice for visitor interactions</p> <p>Craft stories to tell about the research and researchers</p>	<p>Lead a program for peers</p> <p>Give peers feedback on their program sketches.</p>
<b>Highlights of the Session Agendas</b>			
<p>Introductions</p> <p>Icebreaker, graphing</p> <p>Listing questions</p> <p>Research Presentation 1</p> <p>Visual library verview</p> <p>Generating curiosity open-ended questions</p> <p>Modeling Keynote</p> <p>Research Presentation 2</p> <p>Recap and expectations</p> <p>Wrap up</p>	<p>Review agenda</p> <p>Science Messages</p> <p>Take a Stand</p> <p>Research Presentation 3</p> <p>Science storytelling</p> <p>Extending an interaction</p> <p>Roving with a Visual Library</p> <p>Prep &amp; Hands-on, researcher-led experience</p> <p>Wrap up</p>	<p>Review goals</p> <p>Review plan for interpretive sketches</p> <p>First, last and lasting impressions</p> <p>3 small group sessions</p> <ul style="list-style-type: none"> <li>• Discuss readings</li> <li>• Practice with visuals</li> <li>• Share and develop program ideas</li> </ul> <p>Plan a reconvening to share learning</p> <p>Wrap up</p>	<p>Review process</p> <p>Interpretive program sketches</p> <p>Wrap Up</p>

## Before Professional Development Sessions Begin

### Allow 2 months or more in advance of Session 1

- Recruit scientist(s). See *Getting Started with a Scientist New to iSWOOP*, Appendix, page A-3.
- Plan site-based work component with the featured scientist(s).
- Develop a visual library with the scientist. Consult the participant packet pages on collecting visual materials, and Appendix, p. A-4 for more guidance.

### Allow 1-2 months in advance of Session 1

- Consider setting up an application or registration form.
- Establish times and place(s) for sessions.
- Recruit and select participants (interpreters, volunteers, interested rangers from other divisions who interface with the public, staff from nearby parks, nature centers, and partners).
- Select participants. Plan for ongoing support, like a monthly share or time for interpreters to shadow each other.
- Choose readings and review them, for example:



- 1) The article "Class Helping Future Doctors Learn the Art of Observation" from <http://news.yale.edu/2009/04/10/class-helping-future-doctors-learn-art-observation>
  - 2) Project Viewpoints on Science (in the participant packet)
  - 3) *Ignorance: How It Drives Science* (Session 2 and 3) or his interview on *Diane Rehm Show* <http://thedianerehmshow.org/shows/2012-05-22/stuart-firestein-ignorance-how-it-drives-science>
  - 4) Articles on visuals and iSWOOP in *Legacy Magazine*, e.g., "Inspiring Visitors' Scientific Inquiry" by Alyssa Parker-Geisman, 2017, and "Talking Visuals in a Digital Age," *Legacy Magazine*, 2019.
  - 5) Articles by the scientists. Assign these ahead if you prefer interpreters come with questions or assign after the scientist's presentation if s/he/they prefer to have interpreters predict and speculate without knowing the conclusions drawn.
  - 6) An excerpt from *Don't Be Such a Scientist* or recommend a youtube video of author Randy Olson discussing his book. such as [https://www.youtube.com/watch?v=XjaTDA-9\\_sk](https://www.youtube.com/watch?v=XjaTDA-9_sk) (Sessions 1 and 3)
  - 7) The journal article *Even Einstein Struggled: Effects of learning about great scientists struggles on high school students motivation to learn science* by Lin-Siegler et al. (Sessions 2 and 3)
- Send participants the details for the sessions including dress, start time, what to read or bring. See sample email in the Appendix.

## Setting Up

Whenever possible, project from a computer where you can download files and videos and save screenshots so that you don't have to rely on an internet connection.

Arrive early to set up the room, check the temperature, and arrange chairs and tables to facilitate conversation.

- Post the agenda, organize handouts, etc.
- Be ready to explain where restrooms and vending machines are located.
- Bring copies of a participant list with contact info to distribute (or compile one during the meeting).

# Facilitating the Sessions

## Facilitating Session 1: QUESTIONS AND TECHNIQUES / HOW WE KNOW

### Summary

Participants learn about scientific studies and experience activities they can later lead with visitors to offer opportunities to increase science literacy and visual literacy.

### Objectives

- Participants will be able to explain research questions, methods, and findings from at least one study.
- Participants will be able to relate their own and visitors' questions to the scientists' area of study.

### Materials

- Index cards, one per person for Introductions
- Markers, dark colors, thin and thick if possible
- Large (3" x 5") sticky notes -or- scrap paper for Questions Drive the Agenda
- Have available blank paper of different sizes (e.g., 3" x 5", 8.5" x 11", 4.25" x 11", 11" x 17") so participants can talk about the impact of scale, during the Icebreaker on stress
- Computers/iPads or printed copies of the visual library

### Preparation

#### 1) Prepare and post a sample filled out index card with:

- The number of years/seasons with park service;
- Yes or No for a science background,
- A number -5 to +5 to express their level of agreement with the statement: *It's easy to get visitors interested in science.* From strongly disagree (-5) to strongly agree (+5)

3 yrs
Yes
-3

#### 2) Prepare copies of digital or print collections of visual material so that interpreters can experiment with juxtapositions and sequences without compromising originals.

#### 3) Check in with the scientist(s). Confirm the supplies needed. Talk through expectations. When interpreters generate questions, the scientist should comment on them without answering in detail (for example: *I have researched this* or *No one has done it*). Request that the scientist participate in activities, not just appear to give a lecture. Decide: will you each welcome interruptions during your presentations?

#### 4) Listen to the scientist's presentation to make sure terms are defined and slides are clear. Talk through a plan for a hands-on demo with instruments like a thermal camera, nanotag, coring devices, or sound meters and the accompanying visualizations that are based on these technologies.

Give the scientist a heads up to prepare at least one two-minute long story (about finding or conducting the research). Participants will be asking the scientist questions during the session to elicit details that

will help them, the interpreters, tell a suspenseful, compelling story to visitors.

- 5) Finalize and post the agenda for Session 1. Include breaks!
- 6) Begin a list of ground rules on easel pad paper. Have them ready to post. Ground rules may include:
  - Bring a spirit of experimentation; welcome new ideas.
  - Trust the group; share what does and doesn't work.

### Session 1 at a Glance

- 1 Introductions of Presenters and Participants (10 minutes)
- 2 Introduction to the Goals and Ground Rules (20 minutes)
- 3 Icebreaker (10-15 minutes)
- 4 Questions Drive the Agenda (30 minutes)
- 5 Research Presentation 1 (45-65 minutes)
- 6 Visual Library Overview (40 minutes)
- 7 Generating Curiosity with Open-ended Questions and Visuals (40 minutes)
- 8 Modeling Keynote TM (15 minutes)
- 9 Research Presentation 2 (50-60 minutes)
- 10 Recap and Expectations of Interpreters (20 minutes)
- 11 Wrap up (20 minutes)

## Steps

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### Introductions of Presenters and Participants (10 minutes)

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- 1) While participants are getting settled, hand out index cards. Participants write the number of years/seasons with park service; indicate if they have a science background or not, by writing yes or no; and express where they stand along the continuum of strongly disagree (-5) to strongly agree (+5) with the statement: *It's easy to get visitors interested in science.*
- 2) Introduce yourself, co-facilitators, and scientist(s). Mention connection to iSWOOP, an initiative supported by the National Science Foundation in recognition of the important work park interpreters do.
- 3) Go around the room giving participants a chance to introduce themselves and explain their rating.
- 4) Stop every fifth or sixth person and ask participants to summarize the data and offer predictions,

interpretations, and any comments (surprised or not by the ratings).

- 5) Thank participants and transition by noting that the workshop will give them ways to connect science to visitor's interests to expand the audience for park-based science stories.

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## Introduction to the Goals and Ground Rules (20 minutes)

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- 1) Review the main goals for the professional development sessions:
  - Get up to speed on research.
  - Participate in site-based work to increase your ability to talk about how the research is done.
  - Try strategies you can use with the public to invite interaction with you and among themselves about the research and scientists' visualizations
- 2) Go over the goals for Science Communication (see p. 1). Acknowledge those sitting in the room may be familiar with them already. Participants may follow along in their packet, p. 5.

In a nutshell, this project is meant to advance STEM (science, technology, engineering, and math) learning among national park visitors. **iSWOOP programs and informal interactions led by interpretive rangers will give visitors an opportunity to appreciate the importance of parks for research through a guided, live conversation.**

The graphic on p. 3 (also p. 6 of Participant Packet) shows project components and expected outcomes.



For more background on iSWOOP, explore the iSWOOP website.

- 3) **Overview of the agenda.** Refer to the posted agenda or Session at a Glance.
- 4) **Establish ground rules/agreements** and remind participants that we welcome them into this space. Review the list you prepared and ask the group to contribute ideas that will make the learning environment comfortable and productive for them.
  - Bring a spirit of experimentation. Add new approaches to your repertoire.
  - Trust the group; share what does and doesn't work.
  - Trust the visitors. Listen more and talk less as with audience-centered interpretation.
  - [Add ideas from the group].
- 5) **Acknowledge what sets iSWOOP apart.** Lots of parks are doing science-related programming. What's different about iSWOOP? Talk through the page "What iSWOOP Is and Is Not". Ask participants for examples from their practice or offer some from your experience. Highlight:
  - It increases science literacy, revealing how we know what we know/telling stories of research obstacles
  - It increases visual literacy—making sense of images sparks conversations and predictions.
  - Visitors figure things out by talking among themselves or in conversations with rangers (about images and the "so what" — why it matters). Offer an example: At CAVE, bat flight programs convey facts about Brazilian free-tailed bats: how high they fly, how fast, and how many pups a mother gives birth to. In an iSWOOP-influenced program, interpreters would talk more about how scientists know what they know, and engage visitors in asking what other questions they are interested in, what the challenges might be to finding out the answers, and what the trade-offs might be (for example, if potentially injuring bats comes into the picture).

- It builds on interpreter's toolkits by strengthening techniques they may already use, like telling stories. However, iSWOOP's approach to science communication centers on interpreters:
  - a) Inviting visitors to observe and speculate
  - b) Experimenting with new hooks and prompts
  - c) Inspiring curiosity, and keep questioning going (as opposed to imparting facts through one-way communication).

## Icebreaker (10-15 minutes)

Introduce the icebreaker. Say, for example, “Visuals and stories are excellent, generative, equal-opportunity points of entry. We'll be working with both visuals and stories throughout the session(s) and starting with this warm-up, I'll ask you for a visual story based on your day yesterday.”

- 1) Give the following instructions:

Pick a piece of paper. Draw a graph with a line that represents your stress levels during your waking hours yesterday. It's up to you if you want to use labels or a title.



**Optional:** Offer paper of different sizes so participants can talk about the impact of scale, i.e., 3" x 5" index card size versus 8.5" x 11" versus 4.25" x 11", and 11" x 17". The person using 11" x 17" paper doesn't necessarily have more stress. We have to look at the scale, if there is one.

- 2) As people finish, take the graphs and put them on the floor. Ask everyone to gather around. Ask for a volunteer to be the first to pick a graph. Ask that person:

What do you notice? What story can you tell based on this graph?

- 3) Ask a different participant to pick another graph and compare the two by telling a story about each.
- 4) Ask a third participant to say something true about the whole set or to ask a question about the set.

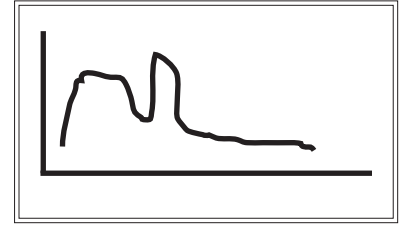
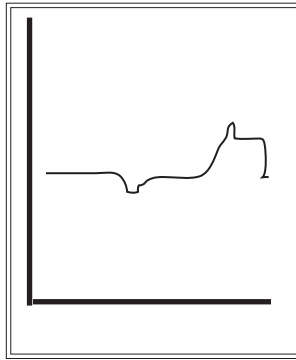
Discussion points:

- What did you know/draw on to make sense of the information here?
  - Why is this relevant to iSWOOP? (If no one else makes these points, explain that iSWOOP has a number of goals, which include increasing visitors' science and visual literacy. This activity gives us a chance to warm-up and practice a bit of both.) In iSWOOP professional development, we want to examine and discuss scientists' visualizations with the public. That means taking a close look and making inferences about the shape of the data.
  - (If assigned) How does the activity relate to the pre-session readings? (i.e., Yale doctors training in observation—we want people to observe details and think about them. Begin to see and tell stories from data. Anyone who compared two graphs used juxtaposition which comes up in Olson's Don't Be Such a Scientist).
  - Why stress? Why not relaxation? Either could be fine. Visitors might be relaxed because they are on vacation or not. Talking about our stress levels is potentially a way in to talking about wildlife being stressed out and/or relaxed (getting to a protected park or stressed out because of scarce food, habitat loss, predators).
- 5) Debrief the activity. Take comments. To promote discussion, ask:

Could you use this activity with visitors? How might it change? For example, visitors could draw in the air or the interpreter could set out some pre-made graphs and ask participants to choose the one that is closest to their experience.

*One person has a stressful home life. Her stress goes up in the afternoon.*

*The other person dealt with a crisis in the afternoon, but then the rest of the day he was relatively calm.*



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### Questions Drive the Agenda (30 minutes)

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- 1) Tell participants you will be asking them to write down questions they have heard about [Science topic at hand]. These may be based on firsthand experience of the resource, conversations with visitors, or reading articles.
- 2) Hand out 3" x 5" sticky notes (or index cards or scrap paper). Pass out pens or pencils if needed. Ask participants to write each question on a separate piece of paper. Remind them that other people will be reading them, so they need to write clearly using large letters. Give at least five minutes for participants to jot down questions.
- 3) Pair participants or form groups of three. Each group should have tape or glue stick. Give the groups 5-10 minutes to combine and sort their questions, making a display on a sheet of easel pad paper. Each group can asterisk 3-5 questions that are most important to them. When groups have completed this task, ask a volunteer from each group to share their top priority questions.
- 4) The scientist(s) at this point circulates, reads, and comments. She or he makes notes (mental or written on the easel paper). He or she may move questions around to show which he or she has investigated vs. those investigated by others, or ones yet to be investigated. Avoid getting into a lecture that answers all of the questions. The point is for the questions to drive the agenda.

During the discussion of their lines of work or during fieldwork, the scientist can come back to these questions, answering as many of these questions as possible.

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### Research Presentation 1: Overview of the study (45-65 minutes)

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- 1) The scientist or facilitator introduces this presentation with a nagging question such as "How many bats are there?" or "Do amphibians detect climate change?" Note that these can be answered with yes or no or a number, but the more interesting part is how scientists figured out the answer.
- 2) The scientist then presents, giving technology and methods their due, talking through how song meters, thermal cameras, coring devices or other instruments are used.
- 3) The scientist may speak without slides and then afterwards share photos of the study site, the research in action, the figures and findings.



**N** You may interrupt during the presentation, to ask the scientist to pause and ask interpreters to examine, observe, speculate, and make predictions (based on figures and graphs).

- 4) Encourage Q&A, as time allows (roughly 15 minutes). If time, reflect on the value of pauses.



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## Visual Library Overview (40 minutes)

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Provide an intro to the visual library, by projecting each image in turn. Note that iSWOOP established a visual style or visual language. For more on the design decisions we found effective for interpreters in real-time conversations, see "Talking Visuals in a Digital Age, in *Legacy Magazine*, 2019.

Explain the process you'll follow for discussion (as follows). You'll go through the slides slowly and silently. Ask each participant to choose two to come back to for discussion--one they think has potential for use with visitors and one that they have questions about (it may need tweaks to be effective).

Scientists may be asked to clarify, but don't need to defend visualizations. Different designs may work for different audiences and interpreters are experts on park visitors.

- 1) Discuss interpreters' responses and keep a running list of ideas, modifications, and additions to consider. Some changes might include simplifying the composition even more (removing titles and labels), separating elements so that a map or photo takes its own slide rather than being a collage.
- 2) To prompt discussion, ask scientists to weigh in to clarify or explain. Ask interpreters to expand on how they could use the images. Begin talking about sequences and images to juxtapose to generate conversations with visitors.
- 3) Wrap up discussion by emphasizing that images and videos are a jumping off point for visitors to observe, predict, and speculate. Use them as a prompt for discussion. They are more than eye candy.



Make sure to give credit for the visualizations. Remind interpreters to credit the source.

Explain how interpreters will have access to the visual library (on an iPad, as a set of laminated photos, etc.)

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## Generating Curiosity with Open-Ended Questions and Images (30-40 minutes)

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Set up and run the activity, which equips interpreters to engage visitors and spark curiosity.

- 1) Tell participants that you will give them a short time (suggestion: 3 minutes) to look at an image (or video) and write as many questions as they can think of. The questions might be their own questions for a scientist or questions they could ask visitors. Make certain that everyone has something to write with and on.
- 2) Display an image or video clip. For example, you might play a clip of bat emergence taken with a high-speed camera or show a handful of frog's eggs. You can deliberately choose something that is ambiguous, like a close-up of a land map with various zones or a spectrograph that looks like an interesting textile.
- 3) Give the signal: *1, 2, 3, GO!*
- 4) Participants make notes on their own questions and/or questions they might ask visitors.
- 5) Convene the group (10 mins, steps 5-8). Ask volunteers to read examples from their list.



- 6) Continue the discussion by introducing the idea of open and closed questions. Refer to the *Types of Questions* section on p. 27 in the Participant Packet.

- 7) Ask for an example of a closed question. Then ask for an example of an open question.
- 8) Refer to *Tips for Examining Visualizations with Others*, p. 29 in the Participant Packet. Note that many of these questions are based on research on needed skills for visual literacy. Others were developed by a collaboration of educators, scientists, and artists to promote critical thinking. Take your time and encourage thoughtful discussion. These prompts can open new lines of conversation.

Share visual prompts and discuss them asking, for example:

*Which questions sound like something you already ask?*

*Which are a little off-beat or different?*

*Can you imagine how visitors might respond?*

Then, ask something like:

*Why are these worth trying?*

*What might you hear from visitors if you ask these questions?*

*In what ways do these get at visual or science literacy?*

- 9) Ask participants to go back to their lists and alone or with a partner, to re-word questions. Taking about 10 minutes, the idea is for participants to reword questions so that closed questions are open-ended and open-ended questions become closed. If participants struggle with this, suggest that they think about sentence stems like “*What if...*”
  - If interpreters are familiar with facilitated dialogue, they can think about the **Four Truths**. Asking about cultural perspectives (social truth) and personal opinion (personal truth) are two ways to make closed questions more open.
  - Next, challenge participants to then sequence or at least pair questions on their lists. The sequence should be from least difficult to most difficult, from least reflective to most reflective.
- 10) Debrief the activity. (10 minutes)
  - Ask participants in what ways this was difficult or easy, new or familiar. Solicit thoughts about how they might use the prompts or the handouts in planning interpretive programs.
  - Make written or mental notes during this debrief for points you might come back to during a future session. For example, when participants have the chance to role play conversations with visitors, they will use questions to keep the conversation going and the idea is to reach for questions and prompts that go beyond yes or no questions and sharing natural history facts.
- 11) (If assigned) Ask participants to relate the activity to the readings they did prior to the session (e.g., the article on medical students observing paintings). Ask for volunteers to explain:
  - How the activity relates to the goals of increasing visual and STEM literacy
  - In what ways their questions led to establishing personal or intellectual connections.

### Examples of questions using the Four Truths

For more information, see <http://idp.eppley.org/sites/default/files/Four%20Truths%20Power%20Point-BL-2016.pdf>

(Forensic truth) How do scientists tend to regard xyz? What are some of the facts that are important for everyone to know about xyz?

(Personal truth) As you were growing up, what were your experiences with xyz? How do you feel when you see xyz?

If you were in charge, how might xyz (or attitudes toward xyz) be different?

(Social truth) What ideas or attitudes about xyz are common or popular in your community?

(Healing truth) If the world were set up for fairness and equality, how might xyz (or attitudes toward xyz) be different?

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## Modeling Keynote™ (15 minutes)

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Although some find the learning curve for using Keynote™ to be steep, the software offers the ability to show clips of longer videos as well as to juxtapose two videos.

Schedule Software Practice (in Session 3 or at other times).

- 1) Show how to use Keynote™ on a laptop, particularly:
  - The presenter view
  - The commands for Hide/Unhide slide
  - Controlling video start, end, loop, and start on command from the Inspector panel
  - Moving slides around
- 2) Make duplicates of the template so interpreters can experiment and tailor a version of the slides in a sequence that makes sense to them.



Optional: Circulate a sign-up sheet with times for interpreters to use Keynote™ on iPads and laptops between PD sessions.

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## Research Presentation 2 (45-60 minutes)

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- 1) Reconvene the group. Spend a couple minutes reviewing the list of questions interpreters generated about the research. Check off any that were addressed in the first research presentation and highlight questions that are about to get answered.
- 2) This session might introduce a new but related study by the scientist or an associate. Or it might be a time to go deeper into how we know what we know.
- 3) Encourage Q&A as time allows.

---

## Recap and Expectations of Interpreters (15 minutes)

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- 1) Recap elements from the day so far. You might ask what activities or ideas made an impression on participants. Listen for responses such as open-ended questions, scientists' process, telling stories from graphs, using scientists' visualizations as a jumping off point to increase curiosity, personal and emotional connections, as well as visual literacy and science literacy.
- 2) Use the responses to emphasize: being intentional with questions; using images and the natural resources to invite observations, predictions, and speculation; highlighting technology innovations; showing how we know what we know. Then transition to expectations of interpreters.
- 3) Review supervisors' and scientists' expectations. Examples follow.

Expectations	When
Rove	Tallies for number of contacts, regular reporting
Be ready to lead a program	Outline of program
Keep track of questions visitors pose	During programs and informal interactions
Share questions with colleagues and scientists	Staff meeting or designated sharing time
Give credit to researchers. Make them visible	During programs and informal interactions;

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### Wrap up (20 minutes)

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- 1) Run the activity Take a Stand. Instructions are as follows:
  - a) Pick an area of the room large enough to allow interpreters to spread out across an imaginary continuum. Explain that one corner or wall represents "Strong agreement" and the opposite corner "Strong disagreement". The middle of the room represents "Not Sure."
  - b) Tell the participants that you will read a statement and ask them to take a stand along the continuum at a point that best matches their opinion. For example:

*The content we covered today will make a difference to the visitor experience.*

- c) After everyone has taken a position, explain that you want to hear some of the reasons for people's positions. Tell participants that if they hear something persuasive and their opinion has shifted, they are encouraged to move to a new spot.

Begin by calling on someone within the largest cluster. Move on to other points on the spectrum. Ask if anyone who took roughly the same position has additional thoughts to add. Traditionally the facilitator does not express his or her own view, but might offer additional information and ask if that leads anyone to change position.

- 2) Debrief the activity by asking:

Has anyone has done the activity with visitors? With visitors on a science topic?

If no one has, ask:

How did it feel to participate in this activity? What was appealing about it? What was uncomfortable? How do you predict visitors would respond to this activity?

Point out that instructions for leading this activity are on the Common Learning Portal as part of techniques for audience engagement) and in the participant packet, Techniques for Inviting Active Participation).

- 3) Assign homework. For example: before Session 2:
  - Participants can try their hands at writing statements to use with visitors to clarify values.
  - Read background information (*Legacy* article by Alyssa Parker-Geisman, 2017) and visual language "TalkingVisuals" in *Legacy*-Sept./Oct. 2019.
  - Read about the science (articles, annual reports on [irma.gov](http://irma.gov), or about the technology).

## Facilitating Session 2: DOING SCIENCE TOGETHER

### Summary

The heart of this session is doing science together. The first part of the session sets participants up with a framework for science as process. Science is more than a collection of interesting facts about how the world works. The second part of the session is preparing for and contributing to the featured scientist's study.

### Objectives

- Participants will be able to represent the research based on first-hand experiences.
- Interpreters will gather details for stories about the researchers' struggles and breakthroughs.
- Participants will reflect on science messages that are inclusive

### Materials

- Name badges / paper for name cards
- Flip chart easel pad
- Markers, two colors per person
- Large (3" x 5") sticky notes -or- paper cut in halves or thirds
- Extra pencils and pens
- Tape
- Supplies and equipment for scientist's presentation and hands-on component

### Preparation

- 1) **Check in with the scientist(s) about the site-based, hands-on science component.** Confirm permits are in place and who is responsible for providing equipment or supplies. Talk through which questions, posed by interpreters during Session 1, will get answered.
- 2) **Ask the scientist(s) to prepare a two-minute story** about how s/he became involved in this research as well as **to plan a hands-on demonstration** with instruments like high-speed or thermal camera or coring device or sound collection equipment and the accompanying visualizations that are based on these technologies.
- 3) **Recruit a volunteer to lead the icebreaker** and confirm before the session. **Review the instructions** in case the volunteer is not able to lead the activity and you have to.



- 4) **Prep the four Science Messages.** Print one statement (landscape-orientation) per piece of 8.5" x 11" paper (minimum size). You can also use 11" x 17" paper or easel pad paper. Write LARGE. Hang one statement on each of the room's four walls or in an area where a group can easily gather around them. The statements are:

Science is about questions, about investigating the next question.

Research is about constant revision and refinement. Over time the story is going to change.

One key component of science literacy is "how we know what we know."

Science is for "We the People" to use.



- 5) **Prep and post** at least one set of the four statements in the chart below on easel paper, one statement per sheet. Make and post as many sets as you need so you can have two to four participants working at each one.

That's interesting. I didn't know that.

Thank you for showing me.

That technology is cool.

Nature is amazing.

- 6) **Prepare your ideas** for keeping the conversation going for each of the above in case you have to jumpstart a group. For example, in answer to: "That technology is cool!", you could say, "Have you seen similar technology before? Where?" In answer to "Thank you for showing me," you could ask, "How important is this for all visitors to hear?"



- 7) **Prepare links and slides for science storytelling segment.**

Schedule an interpreter who has had experience using visuals to open dialogue with visitors on park-based science to join and present. Ask this person to talk about the challenges and how they maneuver (with the tablet or visuals in other formats).

- 8) **Finalize and post the agenda for Session 2.** Include breaks! (See Session at a Glance).



- 9) **Select readings to assign for Session 3.** Make copies or have the link to the readings handy.

### Session 2 at a Glance

- 1 Review Agenda (5 minutes)
- 2 Science Messages (25 minutes)
- 3 Take a Stand (15 minutes, led by a participant)
- 4 Research Presentation 3 (60 minutes)
- 5 Science Storytelling (60 minutes)
- 6 Extending an Interaction (30 minutes)
- 7 Roving with Visual Library (30 minutes)
- 8 Overview/Prep for Hands-on Experience (30 minutes or as needed)
- 9 Hands-on Experience (2-3 hours)
- 10 Wrap up (20 minutes)

## Steps

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### Review Agenda (5 minutes)

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Welcome participants and review the agenda for the day.

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### Science Messages (25 minutes)

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- 1) Introduce the idea that interpreters are ambassadors for science. This section engages interpreters in discussion about science: What messages will you convey intentionally or unintentionally?
- 2) Remind the group that the National Science Foundation believes rangers are critical to building the public understanding of science. NSF is also interested in making sure science is attracting youth and young adults to science, technology, engineering, and math (STEM) careers.
- 3) Counteract typical images of scientists – according to some surveys, a lot of people think science is dull, tedious, and only done by white men in lab coats in window-less offices. They think science is a collection of facts, because that has traditionally been what happens in science courses. As professionals with thousands of interactions with the public each year, interpreters are in a position to affect these beliefs and trends by showing something different.
- 4) Explain that iSWOOP has articulated core ideas (drawn from researchers) about what science is. You might guide this activity by saying:

Four ideas about what science is are posted around the room. I'm going to read them and ask you about your science-learning history.

Take a minute to dig into your memory. Go back to your 9th grade science class. Picture the room and the teacher, and recall if you did labs or worked in small groups. What about your 10th grade science class—what was on the board? What about 11th and 12th grade? Did you go outside? What were your tests like?

When I read a message, if it was something that came across strongly in your high school science education, you can go stand by it. If not, stay seated.

- 5) After you have read aloud the four messages and participants have responded, by moving or not, ask the group:

What did you notice? Why is it important to reflect on our own schooling and experience?

Note that we might facilitate in a different way from how we learned. We might be facilitating in a way that is familiar or unfamiliar for visitors.

- 6) Continue by saying:

Now I'm about to ask you to pick a message that resonates most strongly with you. When you get to that corner, share why you picked it and with one or more people. You might also share a memory from when this idea showed up in your science education (in-school or out-of-school).

- 7) Ask volunteers from each corner why they picked the message they did / why they found it persuasive.

8) Discuss further as time allows:

Can we enact more than one message in every interaction? If one feels intuitive, think about how you could touch on one that feels harder to address.

Experiment.

As we work with the scientist, look for examples of each message in action.

Science is about questions, about investigating the next question.

Research is about constant revision and refinement. Over time the story is going to change.

One key component of science literacy is "how we know what we know."

Science is for "We the People" to use.

**N** Interpreters can read more on Project Viewpoints on Science and Technology in their packets on p. 9-10.

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### Take a Stand (15 minutes, led by a participant)

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1) Invite your volunteer to lead a Take a Stand activity (as described in Session 1 wrap up). Assist as needed if the volunteer falters or can't lead after all.

Once again participants listen to a statement and then take a stand along the continuum from "Strongly agree" to "Strongly disagree." Remind them to be ready to explain their stance, and that they may move to a new spot if someone's thought process influences their opinion.

Some sample statements might be:

*Bats are more like birds than they are like humans.*

*In parks, we should use all the technology available to us to understand the natural world.*

Before asking for volunteers to speak about their positions, remind everyone multiple perspectives are welcome. Kick off discussion by asking:

How did you choose your position?

2) Debrief, asking the following:

What worked well? What might be worth trying next time?

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### Research Presentation 3 (40-60 minutes)

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This section is an opportunity to cover a new line of research, introduce a new scientist(s), discuss the person's pathway to becoming a scientist, or to delve into a study skimmed over on Day 1. The scientist(s) presents the research questions, methods, visualizations, and lays a foundation by discussing previous work. As much as possible, this presentation responds to questions interpreters voiced in the first session. If possible, the scientist(s) leads a hands-on demonstration with instruments like high-speed or thermal cameras, coring devices, or sound collection equipment and visualizations.

As needed, interrupt the presenter to ask questions like: *How do we know that? How did you come up with that question?* If there are slides, ask the scientist to pause and invite the interpreters to speculate, predict, and observe.



Set the stage. Within this 40-60 minute segment, the researcher tells at least one two-minute long story about how s/he became involved in this research. Facilitate Q&A, making sure to check in with quiet participants. If running out of time, encourage interpreters and scientists to write their questions down for each other and share via email or the park's social media.

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## Science Storytelling (60 minutes)

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Thanks go to iSWOOP advisor Flora Lichtman, for this segment. See Appendix G: Science Story Frames and Links on A-11. Point out Building a Story: Tips from Experts p. 18 and resource that follows, on p. 19 of the Participant Packet.

Introduce the segment by saying that surveys (BBC News, Pew Research Center finding) find people say that science is boring



or dull. A way to begin thinking about presenting science research is to find a story frame that is the opposite of dull. What's not dull? Flora Lichtman, science journalist, has a list. Review the list and if possible, show video clips to illustrate the points.

Have the scientist tell a 2-3 minute story. Interpreters can interview the scientist using their own questions or "Questions for Scientists" (on p. 17 of the Participant Packet) to tease out a story (e.g., What people or events helped you find this line of research? What will happen if you don't find out? What research or technology would make your job easier? What could 5 to 15 year olds do if they were interested in your research (to follow or contribute)?)

With the group, fill in the details of the story and make it more suspenseful by identifying and elaborating on

- the stakes--what are/were the consequences?
- the setting--what does it look like, smell like?
- the characters--who else is involved? Tell us about an unusual quirk or quality.
- the action--Refer to the Hero's Journey to fill in the blanks.
- the resolution--a punchy ending with a breakthrough, triumph of good or evil, or an unexpected connection.

Give participants time to plan a retelling of the scientist's story (the one just told or something related to the research presentations). Make sure everyone has a way to write or type. Guide the process by suggesting they:

- 1) Pick a frame: This is a story about ...
- 2) Add elements to increase the drama. After 5-8 minutes, encourage everyone to make notes for

### Story Frames: What's Not Dull?

Travel to remote places  
Travel through time  
Journeys literal and metaphorical  
Mysteries  
Gizmos and technology  
Characters

### Add Elements

Something scandalous  
Draw out paradoxes, complexity  
Get to surprises  
Share the eureka  
Be gross  
Wretched excess  
Forbidden love

their beginning, middle, and end.

- 3) Give a few more minutes to ask that they find at least three visualizations to accompany the story and prompt discussion of the park-based scientific study.



(Optional): Offer story starters. After a few minutes, ask interpreters to trade and add to the story their buddy started. Continue like this, circulating the stories for three or four authors. Ask the last person to wrap up.

- 4) After 10 minutes, ask for volunteers to share. If participants are reluctant, ask volunteers to share:
  - their opener—what is the beginning hook?
  - a sentence or two describing a character
  - the image they chose to be last in the sequence and the reasoning behind that choice
- 5) Debrief. You might make the point that if you are giving visitors space and tailoring to their interests, the visitors might take over and derail the story in the middle. Note that even if you lose control of the narrative in the middle, interpreters can usually take back the conversation and bring it to closure with their parting message and punchy ending.

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### Extending an Interaction (20-25 minutes)

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Frame this section by pointing out that interactions may hit a dead end. Interpreters can respond. They may:

- Provoke. Foster curiosity. Arouse, fulfill. Get visitors observing, actively curious and thinking.
- Learn what we can about visitors' interests to build conversation out.
- Establish relevance. Find out why visitors think this work is important and relevant.

Refer to and read out the statements on each page of posted easel paper. The statements are:

Ranger to visitor: Good question. I don't know.

Visitor to ranger: "Thank you for showing me."

Visitor to ranger: "That is interesting. I didn't know that."

Ranger to visitor: We know for a fact that ...

Visitor to ranger: "Nature is amazing" or "God has made a wonderful world."

- 1) Give an overview of the activity: Pairs or groups will have a couple minutes at each statement station to brainstorm responses that invite visitors to say more, that seed conversation among visitors.
- 2) Assign groups or pairs (no more than four per station). Give groups 2-3 minutes at each station. (Allow enough time for groups to post at least three suggestions per prompt.) about 10 minutes total
- 3) After participants have visited at least three stations (after about 10 minutes), ask the groups to wrap up and to review the ideas posted. Together the small groups select among the suggestions on the easel pad, circling three that they think would be most useful in meeting interpretive goals.
- 4) Reconvene the group and facilitate a discussion (10 minutes)
  - Volunteers share their top choices for responding as time allows.
  - Ask for volunteers to comment on whether the task opened new lines of questioning for them.

5) Pose these questions to the group:

Why push for a conversation to go further? How important is it to provoke conversation?

What are the pros and cons to getting visitors talking to each other, telling each other stories, or enjoying each others' ideas?

What are some strategies to rein in a conversation that is running long?

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### Roving with a Visual Library (30 minutes)

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The goal is for interpreters to become comfortable with showing a sequence of visualizations during informal interpretive interactions.

- 6) If using tablets, refer to p. 31-32 in the Participant Packet, Techniques and Tips for Using a Tablet-based Visual Library (5 minutes). Allot time to read silently and then ask volunteers to mention the tip that struck them as helpful.
- 7) If an interpreter with experience using the iPad is available, take time to hear the challenges and how they maneuver with the tablet. (5 minutes)
- 8) Set up to role play roving: assign roles; distribute scenarios. See Appendix H: Role Play Scenarios on p. A-12. (5 minutes). Review Tips for Examining Visualizations with Others, p. 24 in the Participant Packet.
- 9) Interpreters role play for five minutes, then the "visitor" gives feedback. The partners switch roles and repeat. (15 minutes)
- 10) Debrief for about five minutes, asking:

How did that go? What were some questions or comments that worked well? What kept the conversation going?
- 11) Converse about advantages and disadvantages of introducing a screen into the park experience.
- 12) Discuss the sequence of visualizations interpreters used. Refer back to the idea that the experience of any one image is determined by what comes before and after it.

What were your thoughts about responding to interest, building suspense, forging connections, and leaving the visitor with unanswered questions and curiosity?
- 13) Wrap up or if you have time, do another round, switching partners and prompts.

---

### Overview/Prep for Hands-on Experience (up to 30 minutes or as needed)

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The scientists give an overview of the plan and set interpreters up for various tasks.

- an overview of the field work
- the safety precautions

- plan for rotating responsibilities, and
- how interpretation will fit in, e.g., informing visitors of a temporary trail closure.

If there is an authentic opportunity for interpreters to talk to visitors about the study and to show visualizations related to the scientists' study, this is ideal. Before starting the hands-on component, refer back to the four science messages. Ask interpreters to keep a lookout for them in action.

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### Site-based, Hands-on Researcher-led Experience (2+ hours)

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Make sure interpreters have a chance to play multiple roles, for example: operating equipment, staging, confirming that high quality data are being collected, or talking with visitors about the scientific research. If interpretation with visitors is happening, listen in. When the interaction has wrapped up, give the interpreter a chance to say how it felt, and what he or she might do differently next time. Give both positive and constructive feedback.

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### Wrap up (20 minutes)

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After the work, reconvene the group.

- 1) Collect impressions. Ask each participant to comment on the session by completing two sentences:



*Before I ...*

*Now I ...*

Alternatively, ask participants to comment on what gave them a different perspective on science or the resource. Scientists can contribute observations too.

- 2) Refer back to the four science messages. Ask if anyone saw these aspects of science in action:

Science is about questions, about investigating the next question.

Research is about constant revision and refinement.

One key component of science literacy is "how we know what we know."

Science is for "We the People" to use.



- 3) Find out what topics/story interpreters are leaning toward for their own programs. If time allows, go over the prompts for planning an interaction (program or more informal interaction) due at the final meeting. If the group is fewer than 10 people, each person should develop and lead an excerpt of their program. If the group is 10 to 20 participants, consider dividing into pairs. If 20+, form small groups of two, three, or four. Review the instructions and field questions. Point out the outlines in iSWOOP Sample Programs (found on the iSWOOP website under separate cover).

- 4) Solicit social media entries to add to the Park's account.



- 5) Remind interpreters of any reading they need to do for the next session (excerpt from Randy Olson's *Don't Be Such a Scientist, Even Einstein Struggled*, or *Project Viewpoints: Science and Technology*, or other readings of your choice).

## Facilitating Session 3: THINKING THROUGH POSSIBILITIES

### Summary

This session supports the synthesis of experiences, knowledge, and techniques covered in previous sessions. The session starts with a debrief of the scientist's presentation at the previous session. This discussion functions both as a review of the science presentation and as a way to model wrap up questions with visitors. Participants begin planning their iSWOOP programs in small groups. If new devices and software are available, small groups can practice, for example, with Keynote™. Participants consider ways interactions with visitors can feed their professional learning.

### Objectives

- Participants synthesize techniques they have learned, their knowledge about park-based research studies, and visualizations to plan an interpretive program.
- Interpreters craft stories to tell about the researchers' struggles and breakthroughs.

### Materials

- The visual library (on a tablet or enlarged, laminated images)
- Optional: Laptops with Keynote™ or Powerpoint files and templates
- Copies of assigned readings
- Copies of *Make a Plan to Feature Park-based Research* from the Participant Packet
- Sample iSWOOP Program outlines could be helpful examples and for inspiration ([www.terc.edu/iswoop](http://www.terc.edu/iswoop)), and see also the video of Jeanine describing how she prepared to engage visitors on water quality research at Jordan Pond. <https://vimeo.com/user73330279>

### Preparation

- 1) **Review readings.**
- 2) Make sure you, the scientist(s), and anyone you have recruited to help facilitate small group sessions knows the plan for their session.
- 3) **Prepare an easel pad page** with these questions intended for visitors:

Did you pick up something new?

Did you pick up new ways to think about the park? [or its resources, e.g., bats, sea caves]?

What was your favorite part?

What was most interesting?

Complete the statement: *Research in parks matters to me because...* or *Research in parks is...*

## Session 3 at a Glance

- 1 Review Agenda, Goals, and Assignment for Interpretive Sketch (10-15 minutes)
- 2 First, Last, and Lasting Impressions (15 min)
- 3 Planning for iSWOOP Programs (rotating 50 min sessions; 2-3 hours total)
  - Reading and discussion (50 minutes)
  - Break/Transition (10 minutes)
  - Share and develop program ideas (50 minutes)
  - Break/Transition (10 minutes)
  - Practice with devices or software, e.g., Keynote™ (50 minutes) (Optional)
- 4 Plan for reconvening (10 minutes)
- 5 Share sketches (this session or next session depending on time available)
- 6 Wrap up (10 minutes)
- 7 Additional Keynote™ practice and program development sessions (as needed)

## Steps

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### Review the assignment to prepare a plan for featuring park-based research (10-15 minutes)

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- 4) Go over the prompts on "Make a Plan to Feature Park-based Research". Participants have this in their packets on p. 30, or provide copies.
- 5) Confirm with the group how participants will share (will they be solo or in pairs or groups).
- 6) Review the agenda for the session, explaining how the activities will feed into their plan.

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### First, Last, and Lasting Impressions (15 minutes)

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Tell the group this is a chance to air their thoughts about the scientist's presentation at the previous session. Assign pairs. Read a question, give each person a minute to answer, then pose the next question. After all have answered, ask for volunteers to speak to the question that was most or least generative.



Alternatively, invite participants to fill out a card, add a message to a guest book. Then ask for volunteers to share. The questions are:

Did you pick up something new?

Did you pick up on new ways to think about the park? [or a specific resource]?

What was your favorite part or What was most interesting?

Complete the statement: *Research in parks matters to me because...* or *Research in parks is...*

7) Ask for reflections:

How did it feel to answer these? Did you need time or was the answer right there?

8) Explain that these questions are useful in interactions with visitors. They can help interpreters tailor their messages to visitors' interests.

How can interpreters capitalize on answers to such questions?

If participants don't make these points, you can mention the purposes noted below.

Questions for visitors	Purpose of the question
Did you pick up something new?	To determine: Is the interaction revealing something new or novel about the resource? To determine: Was the program stimulating intellectual connections?
Did you pick up on new ways to think about the park?	To determine were new connections formed? Was there a revelation, a chance to practice visual literacy, possible gains in scientific literacy?
What was your favorite part?	To gain insight into interests, prior interests, possibly motivation, and emotional connections
What was most interesting?	To gain insight into interests and possibly motivation

9) Open discussion for questions and other ideas about incorporating the questions into programs.

- Some interpreters alert participants that they will be asking questions.
- Some interpreters weave the questions into the middle of their presentation.

Participants have these questions in their packets on p. 30, at the end of "Make a Plan to Feature Park-Based Research".

If interpreters ask about consent from visitors, explain that the questions are focused on program improvement. As long as answering is voluntary, no personal information is collected, and the questions vary in their wording, no one posing the questions would be violating the Paperwork Reduction Act.

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### Planning for iSWOOP Programs (2-3 hours with transitions and a break)

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- 1) Begin by giving participants 10-15 minutes to read/review the assigned readings.
- 2) Break the whole group into smaller groups. Each group will meet for 50 minutes to work on a task before rotating to a new task. Assign a timekeeper and a location to meet for each group. Clarify that facilitators stay in place; participants move.

Suggeste groups are:

- Group 1: Reading and discussion
- Group 2: Practice with visual displays (iPads, Keynote (as needed)
- Group 3: Sharing and developing program ideas

### GROUP 1: Reading and Discussion

- 1) Discuss a reading such as an excerpt on storytelling (see Randy Olson's book *Don't Be Such a Scientist*) or the packet of iSWOOP Program examples. Questions to discuss:

What stood out for you?

What elements of stories were highlighted?

In what ways do your interactions with visitors "arouse and fulfill"? (Olson reading)

- 2) Relate their interpretive program ideas to session readings. For example, if participants read an excerpt from Don't Be Such a Scientist, ideally they will put the ideas from that selection in action. Some of the author's main points are to satisfy and to increase visitors' curiosity. To do that, we follow Olson's advice:
  - Arouse and fulfill in order to get the content across. Show something novel or colorful the way film does, but offer something substantive and satisfying too.
  - Use interesting juxtapositions, be surprising to increase curiosity
  - Tell a story. Most people are hard-wired to remember information that comes in a story package (with a beginning, middle, and end).
  - Give details about a character. People tend to remember characters more than plot. Characters draw us in. Provide a story, not just the facts about the research.

Make some or all of these points based on findings for ninth and tenth grade students written up in the article "Even Einstein Struggled" (Lin-Siegler, Ahn, & Chen, 2016):

- A persistent and damaging idea among students is that they should stick with science only if it comes easily.
- Hearing about scientists' struggles increases students' persistence and achievement.
- A study found that students who read about scientists' struggles had significantly higher science-class grades than those who read about scientists' achievements. It didn't matter if the struggles were personal, like facing discrimination or dealing with a health problem or related to the research endeavor, like not being able to collect data due to a storm or losing data in a fire.

### GROUP 2: Practice with Visuals (e.g., iPads, Powerpoint, or Keynote)

- 1) Participants take this time to tailor the digital library for their use. If available as a slide deck, interpreters can save a version for their use and then adjust the sequence. Each interpreter should:
  - Build sequences of slides to promote curiosity and suspense
  - Use the commands for Hide/Unhide slide
  - Set video controls: video start, end, loop, and start on command
  - Practice zooming in and out
  - With the iPads, practice pausing and slowly scrolling through videos. Holding a tablet upside down, makes it behave differently. Practice in bright and shady areas too.

### GROUP 3: Sharing and Developing Ideas



In this small group session, interpreters talk through their interests, focus, what visualizations they might use, when they will invite audience contributions, and how they will facilitate those. Scientists and peers give feedback. Scientists may pick up ideas for communicating their research. They may also be able to supply helpful details, correct inaccuracies or suggest ways to avoid over-simplification.



During this segment, facilitators help participants think through a patio talk, program, or other interaction. They should choose a format that makes sense for the place and the types of interactions visitors have with them (not everyone will design and deliver an evening program, not everyone staffs a junior ranger table). If the interpreters' ideas are ambitious or there are multiple competing ideas, help narrow the focus. Including all the research and techniques and visuals from the iSWOOP professional development will likely be overwhelming. Planning interactions with questions, sharing, and challenges using fewer visualizations usually is more effective in meeting visitors' goals to enjoy time with family and friends as well as to see something amazing.

- 1) Remind interpreters to include: a revelation, an invitation to observe, predict, and speculate, and to discuss relevance.
- 2) Remind the interpreters to include open-ended questions about the visitor's interests.

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### Plan for Reconvening—Professional Learning (10 minutes)

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- 1) Many interpreters have asked for and recommended follow up meetings to share insights and experiences. Involve the group in making a plan to reconnect:

If we have a chance to meet again in a month or so, how should we use that time? What do you want to know?

Offer some examples.

What seems to work and when? What location and approach?

What are the promising techniques, the facilitation moves that spark, sustain and deepen dialogue about issues related to conservation?

How are visitors reacting? What are their curiosity questions and emotional responses?



- 2) You could decide to read something and discuss it. For example, ask interpreters to read *Exploring Two-Way Interpretation at Cape Hatteras National Seashore* by Eric Knackmuhs (<https://eppley.org/guest-blog-exploring-two-way-interpretation-at-cape-hatteras-national-seashore/>) or to look through the collection of iSWOOP program examples and to choose one to discuss.

- 3) If possible, announce a time and place to re-connect.

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### Wrap up (10 minutes)

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- 1) Conduct a go-round to gauge interpreters' emotional state/response to the professional development overall. A word whip is one technique for this—each interpreter says three words to describe their state of mind—three individual words or a three-word phrase.
- 2) Take any remaining questions, noting those you want to revisit at Session 4 or another time.
- 3) Follow up with any interpreters who seem overwhelmed or intimidated about designing and doing their program for the group.

## Facilitating Session 4: INTERPRETIVE SKETCHES

### Summary

The purpose of this session is to give interpreters practice with and feedback on their program sketches. This is a final opportunity for interpreters to:

- Confirm that they are on track with resource messaging, scicomm strategies, etc.
- Clarify any questions about the science research or technology that arise during interpretive sketches

### Objectives

- Participants will be able to lead a program featuring park-based research, using techniques to promote audience interaction.
- Participants will give each other feedback on their program sketches.

### Materials

- Scrap paper or sticky notes for written feedback
- Easel pad paper
- Evaluation forms (optional)
- Visual library set-up

### Preparation



#### 1) Post reminders to help structure feedback

- What were the strengths? What techniques (stories, questions) were effective?
  - What might you suggest doing differently for next time?
  - What STEM messages came through?
- 2) Post three words as a reminder: Revelation, Reaction/Interaction, and Relevance.
  - 3) Determine the order of presenters or decide on a process for setting the order with participants.
  - 4) (Optional) Make one copy per person of the evaluation form and make a digital option available as well (Appendix K, page A-15)

### Session 4 at a Glance

- 1 Check in with Participants
- 2 Facilitating iSWOOP Programs for Peers (15-20 minutes/person or pair)
- 3 Wrap up (20 min)

## Steps

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### Check in with Participants

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Bring the group together with an icebreaker that warms up participants' voices or bodies. For example, go around the room, asking each participant to make a sound or offer a chant that everyone else mimics for 20-30 seconds. You can do this with the featured science topic: something you know about birds or glaciers and a sound and gesture that goes with that fact.

Collect on sticky notes or record on the easel pad any nagging questions participants hope will be answered by the end of the session.

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### Facilitating Interactions (15 minutes/person or group)

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Participants will lead 10 minutes or so of a patio talk, walk, or evening program, or other interaction. If time and group size allow, ideally each interpreter will take up to five minutes to describe the setting, the goals of the program, give an overview of the whole, and then lead ten minutes with the group or a subset of the group acting as visitors.

- 1) Set the parameters and expectations for this session, reviewing the guidelines on the assignment sheet. Remind interpreters that the purpose is to give them practice and feedback. The group is acting as a sounding board, not evaluating or judging individuals as qualified or not. Everyone knows these are sketches, not polished final products.
- 2) Offer the following reminders, first the questions that interpreters could pose:
  - Did you pick up something new?
  - Did you pick up on new ways to think about the park [or its resources]?
  - What was your favorite part? What was most interesting?
  - Complete the statement: Research in parks matters to me because... or Research in parks is...

Interpreters can invite participants to fill out a card or add a message to a guest book or graffiti board. Remind the whole group that as they give feedback, they can focus on:

- What were the strengths of the program? (What techniques seemed particularly effective?)  
Techniques include: researchers' stories; questioning, opportunities for visitors to tell stories)
- What might you suggest doing differently for next time?
- What STEM messages came through?



The professional development leader (along with one other person) can give feedback according to these criteria:


- Were there opportunities extended, taken, or missed to increase visitors' *visual literacy* (opportunities for visitors to observe, speculate, predict based on scientists' visualizations)
- Were there opportunities extended, taken, or missed to increase visitors' *science literacy*—opportunities to learn how we know what we know
- Were there opportunities extended, taken or missed to increase civic engagement—opportunities to talk with other visitors and park staff about the relevance of research.

- 3) Debrief program sketches. Ask:
  - What was valuable about seeing and hearing others' sketches?
  - What next steps do you have in mind for your program?
  - How did using open-ended questions feel?
  - What questions, if any, do you have now?

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### Wrap up (20 minutes)

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- 1) Answer any remaining questions.
- 2) List follow up actions to be taken, such as sharing resources or offering one-to-one assistance for refining interpretive program outlines.
-  3) Reiterate any expectations for interpreters.
- 4) Distribute Session Evaluation Forms (Appendix K, page A-15) and ask participants to take time to complete them. Allow 10-15 minutes for this.
- 5) Conduct a final go-round, giving each participant a chance to speak. Use this as an opportunity to gauge interpreters' emotional state/response to the professional development overall. Note both positive comments and those that express uncertainty, skepticism, or anxiety. Consult with interpreters' supervisors on next steps.
- 6) Complete the Reflection form (Appendix J, page A-14).

# Appendix

**Appendix A: Getting Started with a Scientist New to iSWOOP**

**Appendix B: Develop and Install the Visual Library**

**Appendix C: Planning with the Scientist (for professional development sessions)**

**Appendix D: Sample Emails**

- Sample 1: Recruiting participants
- Sample 2: Confirming participation
- Sample 3: Rejection letter
- Sample 4: Between-session reminder

**Appendix E: Science Statements**

**Appendix F: Visuals to post**

**Appendix G: Science Story Frames and Links**

**Appendix H1 &2: Role Play Scenarios**

**Appendix I: Story Starters**

**Appendix J: Reflection**

**Appendix K: Evaluation Form**

## Appendix A: Getting Started with a Scientist New to iSWOOP

Read/Get Informed—consult published articles, research permits, annual reports, or initiate conversations with the scientist or resource managers who know the scientist.

- Learn about the scientist's research
- Learn about the relevance to the park

Identify—through reading or a conversation with the scientist (more ideas in the participant packet).

- What's the puzzling question that might grab visitors' attention.
- What's the unexpected wrinkle, an unexpected prey-predator relationship, an unexpected symbiotic relationship, a surprise cause or effect.
- What methods and instruments does the scientist use? Are these common or is there something the public might not be able to visualize such as a laser scanner or what the machine looks like that preps soil samples for pollen counting.
- Is there a break-through that has come before that has made this current effort possible?
- What work is the researcher doing on-site (or could s/he/they do) that interpreters could participate in during a half-day session? Is there timing to take into account, morning, afternoon, evening, particular season where this will or will not be possible?
- What is a bad day like for this researcher? What goes wrong?
- Who are the important people (mentors, partners, others--remember science is not as solitary as the stereotypes suggest)

Collect available visual material and identify gaps

- Any visual material that interpreters might be able to showcase. Examples of what the process looks like from raw data, graphs, charts, video or stills of science in action.
- Identify any gaps in the visual material that need to be filled in. Make a list and a plan. Are they animations, video, images of instruments, simpler versions of maps or graphs to scaffold understanding.

Start a list of helpful program elements

- Listen for analogies that might help the public understand the scale of a problem
- Listen for opportunities to make a personal or intellectual connection (about loss and change, correcting errors)

Determine mutual benefits— and plan accordingly

- What aspect(s) of this project that will be rewarding to the scientist, e.g., if outreach and public interest, then connect to his or her blog or twitter account, include credit on all images
- Incorporate this outreach into the timeline for work together. Use the park's newspaper, Facebook page, or website to highlight this scientist and his or her work.
- If the scientist is concerned about opportunities for undergrad or grad students to present or otherwise contribute, discuss a role for them in the professional development sessions.

## Appendix B: Develop and Install the Visual Library

### Purpose-driven Use of Visualizations

The dominant use of visual media in science communication is to illustrate or explain to the audience what they don't know. This is the deficit model and usually such imagery feels like a science textbook. Think about images for three purposes: a hook to spark curiosity and grab attention; a catalyst for observing, predicting, speculating, and discussing; and as illustrations of something hard to grasp or see (because it is too large or too small, out of season, or out of sight). Go for images that strike you as art as much as science to expand the audience for park science.

### Getting Started

Start with 10 or 12 images. Reflect on how conversations between interpreters and visitors unfold. Add to the library as needed. Suggestions for getting started and examples for what to include follow.

Assemble the visual artifacts. Include any photos, videos, graphs, animations, and maps from the scientist. See pages 20-24 in the Participant Packet for more ideas for source material.

Optional: Add to the collection—be realistic—schedule time for a photoshoot, videorecording and editing, finding images online, creating simpler versions of graphs, and as appropriate, contacting copyright holders to request permission for use.

Install the visual media (video, stills, animations, etc.) on project or park devices for park interpreters' use.

Create a slide show with presenter notes or a document with images and annotations as in the sample entry from Hristov and Allen.

#### Bridge Crevice

- Video
- Shows the behavior of bats in a bridge crevice.
- Notice the interactions between the individuals. This video was taken in the middle of the day; notice how active the bats are at this time.
- Pair with photos of bridge and thermal video inside the cave. Consider how it might be more difficult or easier for a mom to locate her pup in this environment compared with the cave.



## Develop a Visual Library—Types of Images

TYPE	PURPOSE	EXAMPLE	MEDIA
High-resolution images of the resource	Make aspects of the resource visible; inspire stewardship	Bottomland hardwood forest	
High-resolution images of the research instrument	Visual reference for scientists' tools; illustrate an innovation	Low-tech artificial nest boxes	
Visual of the researcher in action	Illustrate the science process; put a human face to scientific research	Field assistant removing a bird from the net	
Visual of human interaction with the resource	Model how to handle the resource; get across scale	A migratory songbird whose weight is equal to a car key	
Visual that documents the focus of study	Illustrate what was investigated	Emergence of 1,000s of bats from roost	
Video or audio of the phenomenon	Help viewers imagine themselves in the scene	Group dynamics in a dense flight formation	
Image that precedes a graph or visualization	Show the progress of data analysis; what the instruments pick up that is then analyzed	Analysis of bat emergence with computer vision	
Graphs, spectrographs, or visualization	Show the data and other results of the research activity; illustrate evidence	Each colorful trail shows the trajectory of a bat	
Tutorial visual that demonstrates the technology	Scaffold understanding by showing technology in use with familiar objects	Thermal image of candle and icepack	
Juxtaposition of any kind	Highlight characteristics	Thermal image shows heat and cold sources	



## Appendix C: Planning with the Scientist (for professional development sessions)

Schedule sessions with the collaborating scientist. Three six-hour sessions scheduled over three or more days is ideal. With time, you can go into more depth, and segue to program planning.

Agree on the agenda, refer to Overview of the Sessions for elements to include.

Make sure to discuss

- a hands-on activity or challenge that functions as an entry to the research presentation
- the scientist's presentations and
- logistics for a hands-on, site-based experience
- role play scenarios—make adjustments as needed
- how and where scientists' contributions will be credited (on one slide with contact information or as a photo credit on every slide)
- the scientists' presentation(s), which should include:
  - back story on finding this topic, focusing on this species or phenomenon
  - false starts, missteps, mistakes
  - obstacles overcome
  - research questions, methods, and findings

Reminder: If this hasn't come up yet, talk about how to promote the collaboration. For example, ask the park communications point people to highlight the collaboration, to sit in on sessions, observe field work, or interview participating interpreters.

## Appendix D: Sample Emails

### Sample 1: Recruiting Participants

When recruiting, you may include staff from partner organizations, nearby parks, or volunteers.

Greetings,

\_\_\_\_\_ Park is hosting professional development designed to make cutting-edge, park-based science a part of visitors' experience. Interpreters will be chosen who are a good fit for the project—interested in visitor interaction techniques for two-way dialogue, interested in science communication.

A list of what is expected of participating interpreters includes:

- attend professional development sessions
- plan and implement 30-minute programs for visitors (share program plans with peers)
- use content and approaches during informal interactions like roves and tabling events
- attend scheduled meetings; report on how it's going (share visitors' reactions and questions)

If you are interested, please let me know.

We will let participants know by [date] if they will be involved in the upcoming professional development sessions or not.

Thank you for your interest! Contact me with any questions.

[Signature, contact information for point person]

## Sample 2: Confirming Participation, Detailing Logistics

Make sure participants know when and where to show up, what to bring, and how to prepare.

Hi All,

We're so glad you'll be participating in iSWOOP professional development sessions.

[Fill in other scientists' names here] and I will be leading the iSWOOP sessions.

[Insert list of dates and times.]

Before the first session, please:

1) Check out the following:

[Insert list of readings]

Do you enjoy listening more than reading? As alternatives to reading, access NPR interviews and TEDtalks for Stuart Firestein and Randy Olson.

2) Check out the film, iSWOOP in Action (6 minutes)

3) Keep track of your questions

And VERY important, keep a list of questions, both your own, as you read and any you hear from visitors. Your own questions could be technical or curiosity questions you've had for a while. Your questions could be new, "I wonder" type questions triggered by something you read. They could be about the research or about your interpretive practice. Questions are so important to our work. Use stickies or record them on your phone. Keep a running list at your cubicle or scribble them into a journal at night. Just don't lose them.

4) What to bring, what to wear

[Insert information on the following]

- Snacks
- Lunch
- Uniforms when we do field work and interact with visitors

Looking forward to it.

Warmly,

[Signature]

### Sample 3: Writing to declined applicants

Don't forget to let people who applied know if you can't fit them in.

This note is to thank you again for your interest in the upcoming professional development opportunity. Unfortunately during this coming round of sessions, we don't have a slot for you. [Insert any feedback on why here].

Sincerely,

[Name]

### Sample 4: Between-Session Reminder

Hi All,

As a reminder, our next professional development session is [date, place, times]

Come with your thoughts, questions, impressions of professional development sessions thus far, and tell us what visitors are asking, and how you are planning to start conversations with visitors about the science topics we are covering.

Don't forget to read [insert titles and author names]

See you soon!

[Signature]

## **Appendix E: Science Statements**

Enlarge and post these science statements:

**Science is about questions, about investigating the next question.**

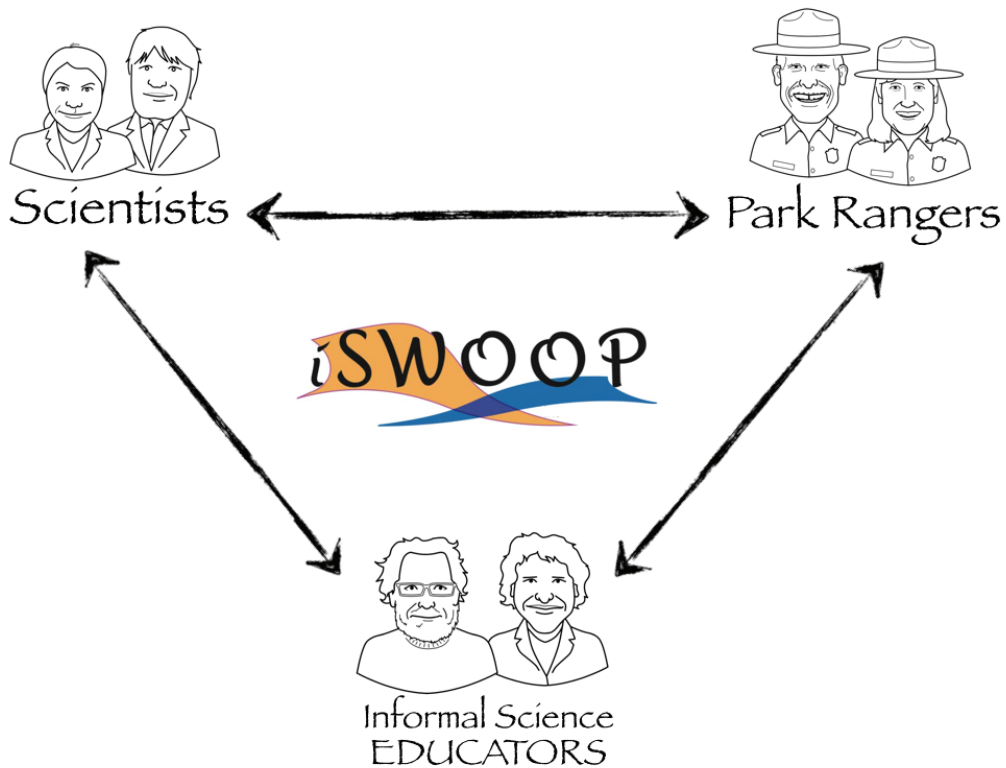
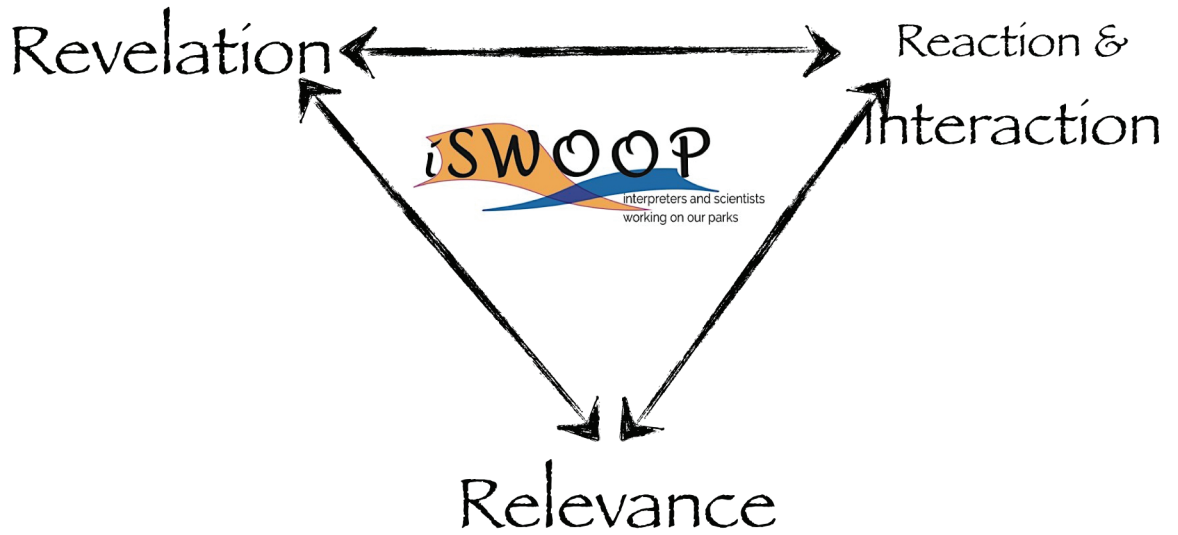
**Research is about constant revision and refinement.  
Over time the story is going to change.**

**One key component of science literacy is “how we know what we know.”**

**Science is for “We the People” to use.**

## Appendix F: Visuals to Post

Enlarge and post:



## Appendix G: Science Story Frames and Links

Remind interpreters that they can mix ideas, but any one of the frames might get their story started with a compelling hook.



Frame	Suggestions for clips to show
Travel to crazy places	Use fly-through video from the iSWOOP visual library for CAVE (see also Science Friday on Nick). sciencefriday.com. Check the archive for 9/7/2012
Mysteries	Use image or video clip of bridge and traffic in the iSWOOP visual library for CAVE, which is a set-up for the mystery of where bats thrive.
Gizmos/ Technology	Use this segment on the designer of the Lego Car. <a href="https://www.youtube.com/watch?v=u-R3TVmZSL4">https://www.youtube.com/watch?v=u-R3TVmZSL4</a>
Characters	Use this profile on the person who invented Earthships. Characters can help you draw out paradoxes and complexity and something surprising <a href="https://www.youtube.com/watch?v=Fi2YjJ1z1YE">https://www.youtube.com/watch?v=Fi2YjJ1z1YE</a>
Share the eureka	Use <a href="https://www.youtube.com/watch?v=aoCzZHcwKxI">https://www.youtube.com/watch?v=aoCzZHcwKxI</a> to take viewers along as a scientist follows an octopus.
Gross and riveting	Share the segment from Science Friday where Nick and Flora talk about getting peed and pooped on. sciencefriday.com. The show was 9/7/2012

## Appendix H1: Role Play Scenarios

Copy and cut these up. Distribute one per person.

✂                    ✂                    ✂

Hi. I'm wondering if I'll see any bats in the cave today. (spoken fearfully)

✂                    ✂                    ✂

We think bats are nasty and dangerous, but we love caves.

✂                    ✂                    ✂

Why do they call bat babies pups?

✂                    ✂                    ✂

Can I go back to where the bats live?

✂                    ✂                    ✂

Why don't bats roost in this area?

✂                    ✂                    ✂

We went to see the bats in Austin. Are these the same type?

✂                    ✂                    ✂

Is there any white fungus, that disease that is killing bats?

✂                    ✂                    ✂

Nice cave. How long have you worked here?

✂                    ✂                    ✂

I can't walk that far. What am I missing?



## Appendix H2: Role Play Scenarios Generic

Copy and cut these up. Distribute one per pair.

✂                    ✂                    ✂

Hi. I'm wondering if I'll see a [scary reptile or other resource] today. (spoken fearfully)

✂                    ✂                    ✂

We think [wetlands, insects, scat] is nasty.

✂                    ✂                    ✂

That [coring or other process] sounds really boring.

✂                    ✂                    ✂

Can I go in [into the sensitive area]?

✂                    ✂                    ✂

Why don't you know how many there are?

✂                    ✂                    ✂

We saw [blank similar park/resource]. Seems pretty similar.

✂                    ✂                    ✂

I wish the government would spend more money on cancer research and less on parks.

✂                    ✂                    ✂

How is climate change affecting the park [specific species or resource]?

✂                    ✂                    ✂

Nice here. Nope, no questions.

✂                    ✂                    ✂

I am sad to hear I missed the special [seasonal event].

## Appendix I: Story Starters

At one time [begin the story of a journey through time].

Google earth can show us details of the topography in every corner of the world, but ... [name the mystery]

A baby [fill in with the character of your story, bat, bird, insect] was born just the other day... In its first several weeks ...

Estimating crowds at marches and protests gathered to meet the pope, managing the flow of people exiting major sports events ...

Their names are [fill in with scientists, traditional knowledge holders, resource managers, characters you will introduce] and they are important to this place because ...

Your job is to study [a specific resource or feature or the whole park]. You can have any tools or technology in the world that you want. What tools would you want to make your job easier?

It's so hot.

## Appendix J: Reflection

Although it is difficult to do while facilitating, keep track of any issues that arise so that you can address them before wrapping up and make adjustments for future workshops. Use the prompts or create your own list.

### Prompts for Reflection

### Running List of Issues to Address

Which activities/sessions resonated with the group?

Which activities do you want to tweak or rethink?

What concerns were raised that need to be addressed?

Is there anyone you want to tap to lead or be a resource for peers?

What steps do you have in mind to support staff members?

## Appendix K: Evaluation Form

*We hope to run professional development sessions like these in the future. We value your suggestions and opinions.*

Please check the box that best indicates your feelings about each statement.

1. Overall, the content gave me new knowledge to apply in my work.

Strongly disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Overall the content gave me fresh ways to look at my interactions with visitors.

Strongly disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. What will be different in your interactions with visitors as a result of your participation?

4. Comment on the most valuable thing or things you learned from the sessions.

5. What are your recommendations for improvement?

6. Any requests for ongoing support? What format do you prefer (staff meetings, 1:1)?

7. Anything else?

