FROM RISK TO RESILIENCY:

Better Communities Through Science Learning About Local Environmental Risks

THE NURTURE NATURE CENTER

About Nurture Nature Center

The Nurture Nature Center (NNC) is a science-based organization that combines science, art, and community dialogue to get people talking and thinking critically about environmental issues in their communities. NNC has grown and developed in response to the needs of the community and was designed by and for community participation.

March 2013

Why you should read this book:

Do you want to:

Engage a broad cross-section of your community in science learning to help them make informed decisions?

Help your community become more resilient?

If so, read on:

This guide describes an overall approach that Nurture Nature Center (NNC) takes in preparing public programming that focuses on community dialogue. This approach draws on principles of appreciative inquiry, public hazards education, deliberative democracy and public engagement in science. NNC has primarily used the discussion forum model in its work, and many of the examples shown throughout the guide are drawn from that format. Tips for putting together your own forum are available at the end of the guide, but the principles and ideas illustrated here could be used in an array of programming that involves your community and a topic that's personal to community members.

The premise of this guide is simply to start with the needs of your community when thinking about science learning. NNC uses environmental risk topics (flooding, drought, dam removal, air and water quality concerns, etc.) that the local community is already concerned about to engage them in science learning. These issues present an opportunity for science learning that promotes community resiliency because people are interested in learning more about environmental risks that affect their homes, businesses or neighborhoods.

Communities want to understand the science behind an issue, not for the sake of science itself, but because the issue affects them personally. ***Importantly, this approach reaches people who don't see themselves or their families as science learners.*** Providing information about topics that are already important to people elevates the level of service provided by informal science learning institutions. By using environmental risk topics as a segue to science learning, we build on existing community interest and connections and build common understanding between the general public and scientists.

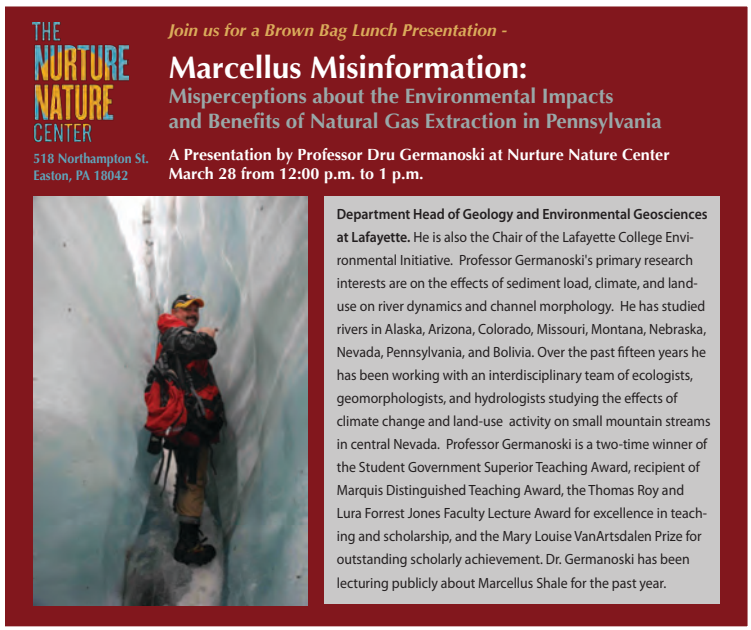
[1] Pfefferbaum, B., Reissman, D., Pfefferbaum, R. & Gurwitch, R. (2005). Building resilience to mass trauma events. In L. Doll, S. Bonzo, J. Mercy, & D. Sleet (Eds.), *Handbook on injury and violence preventions interventions.* New York: Kluwer Academic Publishers.

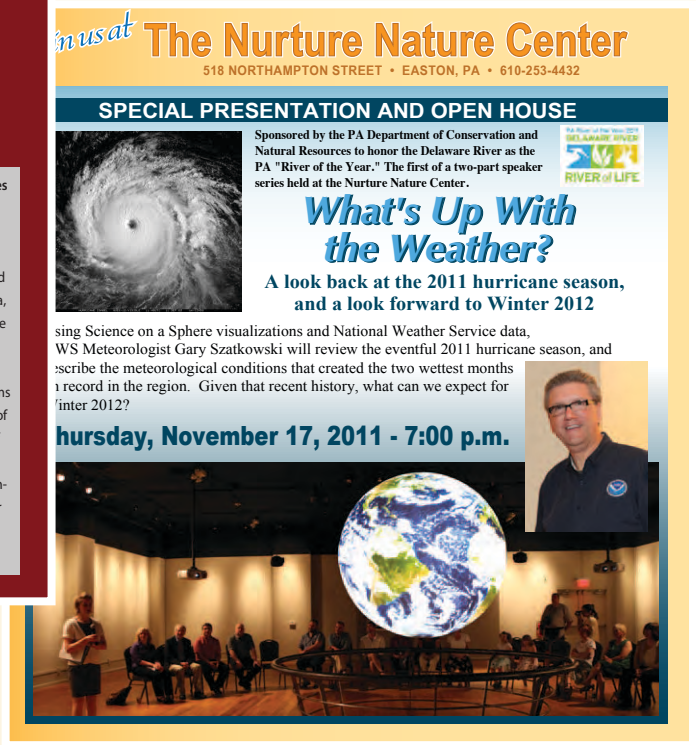
Community Resiliency
is the ability of community members to take meaningful, deliberate, collective actions to remedy the impact of a problem (to interpret the environment, intervene, and move on).[1]

Environmental Risk:
A threat to the environment that poses a real or perceived risk to the people who live there.

Why local environmental risks are an important vehicle for science learning:

- Risk matters to people in the place where they live (affects homes, businesses, or communities);
- People see and experience local risks in their daily lives;
- People are already talking about and concerned about these issues;
- Risk is central to shared community purpose and brings together people from all walks of life;
- Risk motivates science learning and engagement; and
- By starting with issues people care about, science curiosity and learning naturally follows





Two examples of timely topics that address local environmental risks for NNC audiences: above, the highly controversial natural gas drilling using a fracturing technique and right, a program about hurricanes following the devastating hurricanes Irene and Lee.

How to identify local environmental risk topics:

- Watch the local newspapers, ***talk with community members,*** and ask local environmental organizations.
- Local risk issues could be immediate and urgent (flooding, drought, sinkholes) and/or could be issues that communities struggle with over the long term (exposure to radon, poor air or water quality).
- Issues that concern communities may not always be covered in the news and they may be outside the realm of the local conservation community.

Talk with community members to understand the history of the issue in the community. Encourage them to share their histories — their stories.

"The local risk can be urgent or one struggled with over the long term."

— Nurture Nature Center Science Director

How to reach out to and develop programs for communities:

When people feel welcome and comfortable they are open to learning things that help them to address a common interest.

Demonstrate that you value the community's knowledge and experience. Shared stories help make people feel their experiences matter. Value people's voices by:

- Gathering the knowledge and experience (stories) of your community before planning science learning;
- Using community knowledge to inform program development; and
- Using interdisciplinary exhibits and art to help draw non-scientists into conversation and science learning, especially if the exhibits and artwork reflect community experience or include community contributions.

People are encouraged to share their "voice" through ways of communicating that are comfortable.

"This program is for people like me."

— Forum Participant

"You are invited to come to listen or to get up and tell about how the river impacts you."

— Nurture Nature Center Science Director

Interdisciplinary exhibits and art can help draw the community into the discussion.

Use visuals that reflect an understanding of the common areas of concern and/or interest to maximize discussions among community members, scientists and non-scientists. Below, an illustration of a common floodplain scene allows for neutral, non-personal community discussions about the challenges associated with floodplain properties.

Above: Community nature journaling workshop.
Below: Illustration by Tom Maxfield.

Use exhibits and displays to enhance forum discussion.

Illustration: Tom Maxfield

Add to your array of forum tools with visuals such as photographs, diagrams and illustrations based on local issues that can be used to demonstrate risk topics that concern a variety of related issues. Use imagery, storytelling and other creative means to maximize public engagement, draw out items for discussion and to help the viewer connect with their emotions involved in a topic.

"It used to be farmland here. Now there are many trees. The water is better, I think."

— Forum Attendee

Make an effort to promote and recruit. Be inclusive.

Reach the public through personal community connections and neighbor-based outreach. Use a combination of talking person-to-person, personal emails, hand delivered flyers, phone calls and social media outlets. Post information in libraries, coffee shops, community centers, and churches.

"Become part of the conversation."

Encourage community members to help you promote your program in their neighborhood. Neighbors reaching out to neighbors can be an effective marketing tool and will help you find your audience.

Offer a variety of programs and settings.

Hold events in familiar community settings that people are already familiar with (fire halls, churches, community centers) or make your own meeting place welcoming.

Try different formats for the same topic (art exhibits, lectures, films, potlucks, community discussions, family events) to attract a wide array of people with different needs and/or interests.

Know your audience and develop programming accordingly:

- Community-wide forums reach the general public and address risks faced by the whole community. Information and discussion continues at home and within communities.
- Audience-specific forums reach groups that 1) regularly interface with the public (example: teachers) and 2) whose work is affected by the local risk issue (examples: firefighters and emergency managers). Engaging these leaders in learning helps information reach a wider range of people because they pass information through their work and existing community networks.

Engaging specific audiences such as teachers and community leaders like emergency managers or municipal officials in the learning process allows for a wide reach through community networks.

Make events open to the public, inclusive and free, if possible.

Science learning through dialogue and interaction is active and involves participants in the learning process. New ideas are put forth not only by experts in the room, but also by fellow community members. This sharing of ideas can help transform thinking on a topic both for community members and experts. An open structure requires flexibility on the part of the facilitator. A balance between planning and flexibility is important.

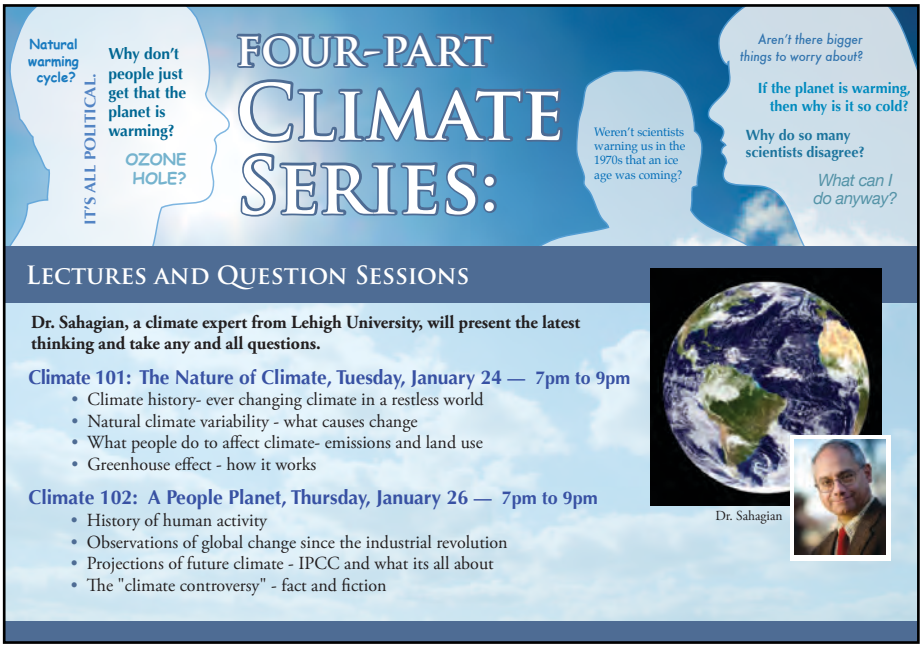
Having snacks at the table helps to set up a welcoming and comfortable environment for attendees.

"I want to learn how we should act when there's a flood, and how we can help our community."

— Forum Attendee

Provide programs for all members of a community, regardless of where people stand on an issue.

Offer neutral programming. Do not advocate for one side or the other on an issue. By presenting the science and avoiding opinions, your programming will be inclusive, rather than exclusive.



Present science information in ways that are useful to the community:

- Provide facts that people care about and that apply to their lives.
- Offer practical information.
- Facilitate the exchange of facts and knowledge between the community and scientists.

A simple refrigerator magnet that encourages people to look up and post the flood stage at their closest stream gauge.

Communicate science using common language and common interest.

Many people don't understand science as a scientist does. Translate scientific information into language and units that people can relate to in their lives. Use what the community knows as a point of entry to teach science. For example, if a person knows that the river reaches his first story window when the river is at a certain height, use this point to teach about flood risk.

- Work with scientific experts so that the information they provide is unbiased, relevant, and easily understood by a diverse audience.
- Scientists should serve as one of many expert voices in conversations about science and factors that mitigate risks.

Discussion vs. Debate

- Pursue understanding, rather than agreement
- Have trained table facilitators that help moderate discussion.
- May have to agree to disagree
- Tell participants that:
  - You want their view
  - They don't need to come to consensus

LANGUAGE BARRIERS

The words we use matter!

Scientist says:	Public hears:	Better choice:
Theory	Hunch, speculation	Scientific understanding
Positive Feedback	Good response, Praise	Vicious cycle
Uncertainty	Ignorance	Range
Values	Ethics, monetary worth	Quantities
Manipulation	Illicit tampering	Data processing
Scheme	Devious plot	Systematic procedure
Anomaly	Abnormal event	Different from average

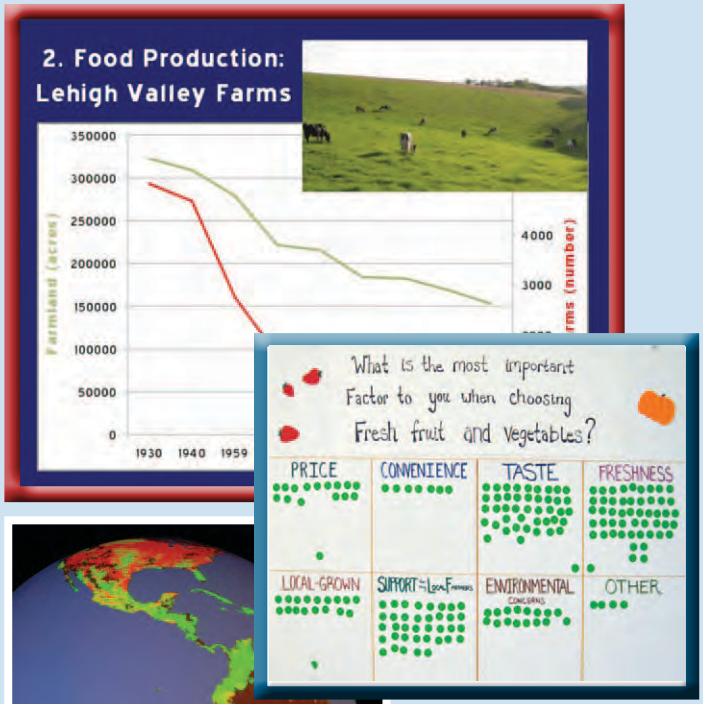
After Somerville and Hassol, *Physics Today*, October, 2011

Provide context to the local issue by looking at it from a global perspective.

If local issues are given a global context, community members realize that they are not facing the issue alone. This context increases community connection and systems understanding.

Global to Local Food Issues

The forum had 80 participants from 12 municipalities and 98% agreed or strongly agreed that the are better informed about issues related to fresh food grown in the Lehigh Valley.

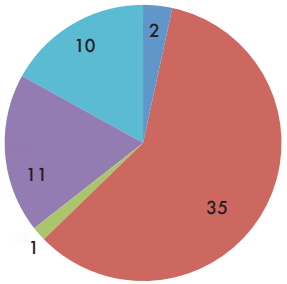


During this dialogue event, local food growers were invited to supply refreshments and attendees were invited beforehand to participate in a photo exhibit, "Food for Thought," which captured their ideas of fresh food.

Climate Change Globally and Locally – A Climate Series

The data below includes feedback from 80 participants in an NNC dialogue event.

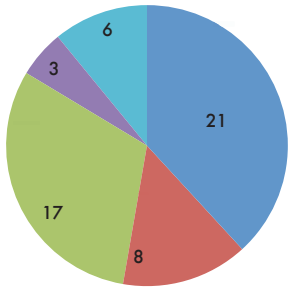
Is it the responsibility of the local community to address climate change?



- a. No, this is not a local issue, but a global one
- b. Yes, each person or community should do what they can
- c. No, I don't believe climate change is pressing issue
- d. No, regulations need to made on the state and federal level
- e. Other

If we can expect wetter conditions in the future and therefore more flooding, how do you think local communities should prepare?

[Please rank the following from 1 (lowest priority) to 5 (highest priority)]



- a. Design and build infrastructure to accommodate increased storm water
- b. Develop better flood warning and preparedness systems
- c. Restrict building in the floodplain
- d. Better protect existing housing in the floodplain
- e. Other

To give the local issue of flooding a global context, NNC developed a program called "Rising Waters" for NOAA's Science on a Sphere® exhibit (above). The program shows repeated flooding on a global scale.

VIDEO

"It's very dangerous to live near a river; you don't know when the river can overflow. I want to know what I should do in case of a flood, where to go or who to call to ask for help." **— A 39-year old female who has lived in Easton three years**

Provide ideas for building community resiliency in the face of environmental risks and natural disasters.

- **Provide possible solutions** to an environmental risk to give the community a sense of hope for the future and a vision to work toward.
- People have a natural inclination to rebuild after disaster. **Use their human desire to seek solutions as a platform for science learning** – educate people about possible resolutions that could lead to stronger, more resilient communities.

"What we as a community need to do during a catastrophe—come together to help one another clean up and help residents directly involved get back on their feet and start fresh and new."

— A 28-year old female firefighter from Lower Mt. Bethel

Sample Forum Question:

If we can expect wetter conditions in the future and therefore more flooding, how do you think local communities should prepare?

(Please rank the following from 1 (lowest priority) to 5 (highest priority)

___ Build infrastructure (sewer, water, etc.) that can handle increased storm water

___ Develop better flood warning and preparedness systems

___ Restrict building in the floodplain

___ Better protect existing housing in the floodplain

___ Other

Comments _____

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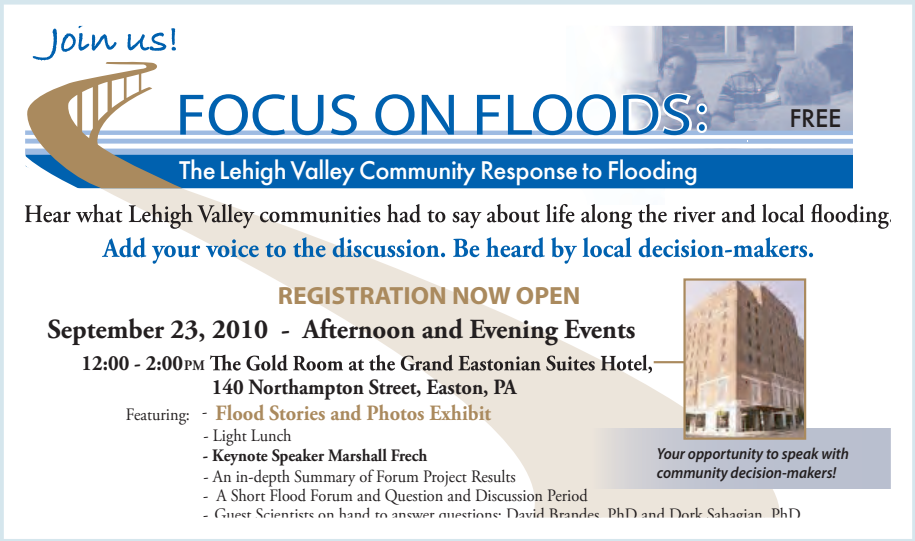
Ask people to create a joint response to risk to be delivered to someone who can do something about the risk.

When program participants know that their time and opinions are valued, it makes the experience meaningful.

- **Talk to decision makers before the event.** Base what you ask of participants, in part, on what information decision makers need to know.
- While promoting the event, **let potential participants know how their voice will be heard.** People like to know that their input will be communicated to others who might be able to do something about the issue at hand.
- During the event, **remind participants that their opinions matter** and tell them how you plan to share their feedback with decision makers.
- After the event, **give feedback to decision makers and distribute a summary of the event through public channels** of communication.

"Add your voice to the discussion. Be heard by local decision makers."

— Nurture Nature Center Science Director



Forum Checklist:

Forums address real community interests and needs.

- [x] **1. Develop idea for forum**
  - a. Form idea based on people's local interests and questions about local environmental risk
- [ ] **2. Discuss topic idea with community decision makers**
  - a. Gauge interests, perceptions

- [ ] **3. Plan forum**
  - a. Recruit science experts
  - b. Develop format
  - c. Advertise and create outreach strategy (on the ground approach – person-to-person communication, flyers, door knocking, personal emails, social media, mainstream media, etc.)
- [ ] **4. Promote, promote, promote and follow-up**
  - a. During promotion, let people know that their feedback during the forum will be shared with decision makers (incentive for attendance)
- [ ] **5. Develop questions for forums based on community/decision-maker feedback**
  - a. Questions (and potential answers) are reviewed by staff, test audience, science experts, local experts
    - i. Multiple choice with optional write-in
  - b. Reformulate questions as needed

- [ ] **6. Train table facilitators**
  - a. Keep discussion on topic and equitable
  - b. No personal views expressed
  - c. No questions answered (to maintain objectivity)

☐ **7. Work with project evaluator to come up with meaningful criteria**

a. Engagement
b. Knowledge gains
c. Intention to act

☐ **8. Forum set-up**

a. Round tables (5 to 6 people per table)
b. Each table has a table facilitator
c. Two to three room facilitators

☐ **9. Hold event — presentation and/or science lecture and facilitated discussion with questions**

☐ **10. Table facilitators report out to the whole room by summarizing main points of table discussion**

☐ **11. Hold brief open floor discussion**

☐ **12. Following forum**

a. Develop decision-maker report based on answers to questions
b. Distribute report to forum attendees, decision makers, and make available on website
c. Use community discussion and evaluation results to inform next forum

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National Weather Service
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