



Sharing Science Workshop and Practicum

Additional Resources for Nanoscience Education and Outreach

Part 1 - Sharing Nanoscience with Public Audiences

The following resources include hands-on demonstrations, videos/podcasts, and content guides from a variety of organizations involved in fostering public engagement in nanoscale science and engineering. These links can provide additional ideas about what content to present, how to present it, and the language/style to use that is most appropriate for public and school audiences.

- **NISE Network Catalog** - <http://www.nisenet.org/catalog/programs>
An online catalog of nanoscience programs and activities that have been developed, tested and evaluated by museum professionals and scientists active in the NISE Network - a nationwide community of researchers and informal science educators dedicated to fostering public engagement in nanoscale science, engineering and technology.
- **Exploring the NanoWorld Activities & Resources** - <https://mrsec.wisc.edu/Edetc/index.php>
An online collection of materials, activities and resources from the University of Wisconsin – Madison MRSEC (Materials Research Science and Engineering Center) developed by their Interdisciplinary Education Group.
- **NanoNerds YouTube Channel** - <http://www.youtube.com/user/NanoNerds>
For examples of how to talk about nanoscience with public audiences, check out the NanoNerds channel. Created by the Strategic Projects Group at the Museum of Science, Boston, the NanoNerds channel includes a variety of videos and podcasts from museum educators and scientists on a variety of nanoscience topics. Includes several clips from the popular *Talking Nano* DVD set, which can be purchased at www.talkingnano.net.
 - Moving Atoms by Don Eigler - Chapters [1&2](#), [3](#), [4](#), [5](#), [6](#), [7](#), [8](#), [8b](#), [8c](#), [9](#), [10](#), [11](#), [12](#), [13](#), [14](#), [15](#), [16](#), [17&18](#)
 - Guiding Light with Nanowires by Eric Mazur - [Part 1](#), [Part 2](#), [Part 3](#)
- **NISE Network Content Map** - http://www.nisenet.org/catalog/tools_guides/nanoscale_science_informal_learning_experiences_nise_network_content_map
The NISE Network content map articulates the 4 key ideas the network has identified as the most important for engaging the public in learning about nanoscale science, engineering, and technology. (*Adapted content map for nanoscience demonstrators to be available in November 2011 at http://www.nisenet.org/catalog/tools_guides/engaging_public_nano*).
- **National Nanotechnology Initiative's Nanotech 101** - <http://www.nano.gov/nanotech-101>
A general introduction to nanotechnology and its potential for broader audiences by the National Nanotechnology Initiative (NNI) - a multi-agency U.S. Government program that coordinates Federal efforts in nanotechnology. You can also download/print a copy of their brochure for the public – “Nanotechnology: Big Things from a Tiny World” (<http://www.nano.gov/node/240>).
- **The Big Ideas of Nanoscale Science & Engineering** – http://www.nsta.org/store/product_detail.aspx?id=10.2505/9781935155072
An overview of the “big ideas” of nanoscience that children/teens need to understand about this emerging field. The guidebook by Shawn Stevens, LeeAnn Sutherland and Joseph Krajcik examines how to reach the learning goals and children’s likely misconceptions about the concepts.



Part 2 – Learning in ‘Free Choice’ Settings and Inquiry-Based Learning Theory & Practice

The following resources give more background and context for how people learn in informal settings, such as science museums, and inquiry-based learning theory and practice. Understanding this type of learning can help demonstrators create an engaging learning experience for public audiences.

- **Science Centers as Learning Environments** - http://www.astc.org/resource/education/johnson_scicenters.htm
A 2005 article by Colin Johnson for the Association of Science and Technology Centers (ASTC) that describes what’s different about learning in informal, “free choice” settings like science centers.
- **What is Inquiry?** - <http://www.exploratorium.edu/IFI/about/philosophy.html>
A general introduction to inquiry-based learning by the Exploratorium’s *Institute for Inquiry*. From this site, you can also access *Pathways to Learning*, an article which delves deeper into teaching and learning through inquiry; and *Inquiry Structure*, a map showing an approach to inquiry that can guide your activities. You can also access an NSF Foundations publication the Institute staff wrote, called *Inquiry: Thoughts, Views, and Strategies for the K-5 Classroom* (<http://www.nsf.gov/pubs/2000/nsf99148/htmstart.htm>). While this document focuses on inquiry in the elementary school classroom, the Introduction and Chapters 1 and 2 offer general background and context for this style of learning.
- **Bringing Nano to the Public: A Collaboration Opportunity for Researchers and Museums** – http://www.nisenet.org/catalog/tools_guides/bringing_nano_public_collaboration_opportunity_researchers_museums
This guide provides an introduction to informal science education and to science museum practice for nano and materials science researchers. It advises researchers on ways to collaborate with science museums to increase the impact of their education outreach activities, and includes a rich bibliography. Pages 8-9 and 13-15, in particular, provide information on how learning occurs in science museums and tips to make researchers successful in these settings.
- **Sharing Science with Children: A Survival Guide for Scientists and Engineers** – <http://www.noao.edu/education/ncmlsbg.html>
This guide from the North Carolina Museum of Life and Science is written for scientists and engineers interested in making effective classroom presentations. Much of the content and many of the tips and recommendations can be applied to the interactions in a museum setting.
- **Planning for People in Museum Exhibitions** – <http://www.astc.org/pubs/mclean.htm>
This book by Kathleen McLean is one of ASTC’s best sellers. Taking a detailed look at all aspects of exhibit design, it also gives good insight into what the visitor brings to the museum experience, how and what they learn, and what they take away from the experience.
- **Learning from Museums: Visitor Experiences and the Making of Meaning** – <http://www.altamirapress.com/isbn/0742502953>
This book by John Falk and Lynn Dierking explains the nature and process of learning as it occurs within the museum context (emphasizing constructivism and free-choice learning) and provides advice on how to create better learning environments for museum visitors.