Nanoscale Science Informal Learning Experiences:

NISE Network Learning Framework

Nanoscale Informal Science Education Network public educational experiences are designed to encourage the six kinds of visitor learning outcomes documented by the National Research Council:

Developing interest in science: Experience excitement, interest, and motivation to learn about science

Understanding science knowledge: Generate, understand, and use explanations, arguments, models and facts related to science

Engaging in scientific reasoning: Manipulate, predict, question, observe, and make sense of the natural and physical world

Reflecting on science: Reflect on science as a way of knowing and as a personal process of learning about phenomena

Engaging in scientific practice: Participate in scientific activities and learning practices with others, using scientific language and tools

Identifying with the scientific enterprise: Develop an identity as someone who knows about, uses, and sometimes contributes to science

The learning framework is a companion to the NISE Network content map, which articulates key science concepts for engaging the public in nanoscale science, engineering, and technology.

The NISE Network's learning framework describes three principles designed to reflect the National Research Council's six learning strands and accompanying learning outcomes. The learning framework principles are supported by examples of the kinds of activities visitors do when they participate in our programs, exhibits, and media.

Imagining the nano world
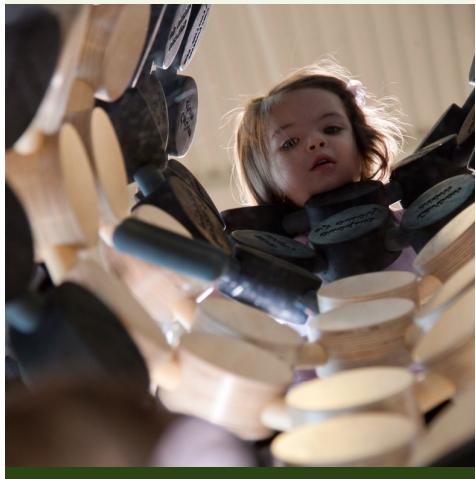
• Explore the relative size of macroscale, microscale, and nanoscale objects

• Use tools (or models of tools) that allow us to investigate the nanoscale world

• Examine magnified images and models of the nanoscale world

• Talk about how we can apply our knowledge of the nanoscale world to create new technologies

Exploring scale and properties

• Observe phenomena demonstrating the relationship of scale, properties, and forces

• Manipulate materials and explore the resulting changes

• Reflect on the nanoscale world and how it works differently from the human-scale world

• Consider how knowledge about the nanoscale world allows us to create new materials and technologies

Connecting nano and society

• Recognize that nanotechnologies may help us solve problems that traditional technologies cannot

• Envision a future in which nanotechnologies are an important part of our everyday lives

• Evaluate the responsible development of nanotechnologies by considering values, risks, and benefits

• Discuss the role of individuals and groups in shaping the development of emerging technologies

Experiencing a model carbon nanotube

Investigating the properties of lotus leaves

Exploring nano and society

Developed by Kirsten Ellenbogen, Troy Livingston, Rae Ostman, Larry Bell, Veronica Garcia-Luis, Marilyn Johnson, Paul Martin, Darrell Porcello, and Greta Zenner Petersen for the NISE Network.