



## Education and Outreach: Nanotechnology Activity Guides

### NanoCommunity

*Audience:* Middle school class

*Time Needed:* Approximately 45 minutes

#### Objectives:

- Define nanotechnology and describe some of its present uses
- Understand that different communities use the same technologies in different ways
- Think critically about how technology impacts their lives and their community

#### Related Wisconsin Model Academic Science Standards:

- *B.8.1* Describe how scientific knowledge and concepts have changed over time in the earth and space, life and environmental, and physical science
- *G.8.2* Explain how current scientific and technological discoveries have an influence on the work people do and how some of these discoveries also lead to new careers
- *G.8.4* Propose a design (or re-design) of an applied science model or a machine that will have an impact in the community or elsewhere in the world and show how the design (or re-design) might work, including potential side-effects
- *H.8.2* Present a scientific solution to a problem involving the earth and space, life and environmental, or physical sciences and participate in a consensus-building discussion to arrive at a group decision
- *H.8.3* Understand the consequences of decisions affecting personal health and safety
- *ELA C.8.1* Orally communicate information, opinions, and ideas effectively to different audiences for a variety of purposes.

#### Activity Materials:

- One piece of poster paper for each group of 3-4 students
- 4-5 markers per group
- Overhead projector
- Overhead transparencies - "[Societal Implications Transparencies](#)" (pdf)
- Handouts describing the communities - "[Community Descriptions](#)" (pdf)
- Ball
- Chalk/dry erase markers
- Chalkboard/dry erase board

#### Activity Instructions:

### *Introduction*

Toss the ball to ten different students. Each student who catches the ball names one example of technology. Have a student write these examples on the board.

Toss the ball to two different students. Whoever catches the ball must pick a technology from the list and give one use of that technology in his or her own life or the life of his or her community.

After the class has discussed a few of the technologies, move on to the Technology Brainstorming Activity.

### *Technology Brainstorming Activity*

Tell the class that they will work in groups to brainstorm uses of their assigned technology, just like the two students who caught the ball did.

Divide the class into groups of 2-5 students.

Introduce the following group activity and assign each group a technology from the board.

The groups will brainstorm the ways their technology is used by themselves, their parents, and their communities. The groups will then present what technology they worked on and how they, their parents, and their communities use that technology.

### *Introduction to Nano-Spider Silk Activity*

Briefly discuss nanotechnology. This includes brainstorming synonyms for the word "small" to emphasize that nano means small.

Also discuss how nanotech will work (moving individual atoms around to create new materials) and current and proposed uses. The overheads provided on the IPSE website will aid the discussion.

### *Nano-Spider Silk Group Activity*

Have the students work in the same groups as they did for the Technology Brainstorming Activity. Each group will be assigned a different type of community. The community descriptions are available on the IPSE website.

Each group must invent a use for nano spider silk in their assigned communities, design a poster featuring this product, and present their product to the class. Each group must include the following information on their poster:

1. What their product is.
2. Why their community needs the product.
3. Details about your community, such as the population and the major industries.

During the poster presentations, the instructor might ask each group the following questions:

1. How will your product improve (or harm) life in your community?
2. Would you use this product?

### *Conclusion*

Throw the ball to five students and ask them to tell you one thing they learned. Restate each student's answer for the class.

**Required Background Information:**

Students should know about atoms.

**Supplemental Materials:**

- Transparencies: [Societal Implications Transparencies](#) (pdf)
- Handout: [Community Descriptions](#) (pdf)

**References:**

- Institute for Scientific Research Website - <http://www.isr.us>
- "Researchers Spin Carbon Nanotube Yarns" - <http://nanotechweb.org/articles/news/1/10/21/1>

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