



Activity 9:

Nanoproducts: Risks and Benefits

Core Concept:

The number of consumer products that contain nanomaterials is increasing dramatically, raising concerns about potential exposures, because the hazards are not well understood. More research is needed to analyze both the benefits and risks associated with products that contain nanoparticles.

Class time required:

Two 40 minute class periods

Teacher Provides:

- A copy of student handout “**Nano Benefits and Risks**” for each student.
- Access to the Internet for research on benefits and risks of nanoparticles in sunscreen.
- Signs in 3 corners of the room:
 - *Good idea*
 - *Bit of both*
 - *Bad idea*

Suggested Class Procedure:

- Distribute copies of the student handout entitled “**Nano Benefits and Risks**” to each student.
- Read the information in the box on the first page aloud to the class.
- Students complete Part 1, working in teams of 2-4 students. Encourage students to develop explanations for their answers.
- Students share their answers and their explanations to Part 1 by moving to the corner of the room that represents their answers for each of the nanoproducts listed in Part 1. Ask several students in each corner to explain their position for each of the nanoproducts.
- Students work individually or in pairs to complete questions of Part 2. Provide computer access to “**Nanoparticles and sunscreen safety**” (available at www.nanowerk.com/spotlight/spotid=714.php) Provide print copies to each student, if they do not have access to Internet.

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- Assign each student to read a different article from the **Friends of Earth** website at www.foe.org Type in the search words “nanoparticles sunscreens.” Students use the information from their assigned article to answer questions 2 and 3 of Part 2.
- Students share their ideas for risks and benefits to complete question 4 in Part 2.
- Students work individually to answer questions 5, 6, and 7 in Part 2.
- Ask students to move the signs (good idea, bit of both, or bad idea) to indicate their answer to question 5. Call on several students at each sign to read the explanation that they wrote for question 5.
- Students share their answers to questions 6 and 7 in Part 2 with the entire class.

Nanoproducts: Risks and Benefits

Nanotechnology is new, and many of the nanoproducts already on the market seem useful but harmless. There are other nanoproducts in the development stage that may become available in the future. Some people think that the benefits of nanoproducts outweigh the potential risks. Other people are concerned that the risks of nanoproducts outweigh the benefits.

Part 1: Nanoproducts - good, bad, or a bit of both

Here is a list of nanoproducts that already exist, or that are being developed for the future. Discuss each item with your team, and decide if your team thinks they are a good idea, a bad idea or a bit of both. Check the appropriate boxes and be prepared to share your reasons with the class.

Current nanoproducts	Good idea	Bit of both	Bad idea
Sunscreens and cosmetics			
Antibacterial bandages and sprays			
Glass with a nanofilm that cleans itself			
Scratch and wear resistant paints			
Nanoscale electronics components – faster and smaller computers, iPods			
Stain-resistant clothing			
Display screens for computers and cell phones – brighter, use less power			
Future nanoproducts	Good idea	Bit of both	Bad idea
Military lightweight armor that is bullet-proof			
Efficient solar cells for cheap electricity			
Nanoparticle filters for removing pollutants from air and water			
Medicine that is delivered only to specific affected parts of the body			
Nanoscale sensors in the body to monitor health			

Part 2: Weighing benefits and risks for nanoparticle sunscreens

For decades, consumers have used sunscreens which contain nanoparticles that absorb UV light.

- Some people think that the use of sunscreens with nanoparticles is a good idea because it decreases people's risk of skin cancer.
- Other people think that the use of sunscreens with nanoparticles is a bad idea because the nanoparticles may be harmful to humans or their environment.

1. Work individually to read the article entitled "**Nanoparticles and sunscreen safety**" (available at www.nanowerk.com/spotlight/spotid=714.php). As you read, make a list of at least **2 benefits** and **2 risks** of sunscreens that contain nanoparticles. Be prepared to share your list with your classmates.

Potential Benefits	Potential Risks
Nanoparticle sunscreens are a good idea because...	Nanoparticle sunscreens are a bad idea because...

2. Work individually to access the articles at www.foe.org/search/node/nanoparticles Your teacher will assign one or two of the articles on this site for you to read and report on. Write the title and URL for the article that you read below.

Students should write the Title and URL of the article that they read.

3. Read the assigned article(s) online to find additional benefits and risks. Add at least **2 benefits** and **2 risks** in the chart below. Be prepared to share your list with your classmates.

Potential Benefits	Potential Risks
Nanoparticle sunscreens are a good idea because...	Nanoparticle sunscreens are a bad idea because...

4. Listen carefully as your classmates share their lists. Add **2 benefits** and **2 risks** to the table below.

Potential Benefits	Potential Risks
Nanoparticle sunscreens are a good idea because...	Nanoparticle sunscreens are a bad idea because...

5. Based on your research and research done by your classmates, do you think that using sunscreens that contain nanoparticles is a good idea or a bad idea or a bit of both? Support your answer using information from your lists.

Student answers will vary. Their answer should be supported by information from their lists.

6. **What actions could you personally take to protect yourself from sun exposure and from possibly hazardous sunscreens?** Make a list of the at least 5 actions you could or should take when there is not adequate information about the risks associated with nanoparticles in sunscreens. Be prepared to share your list with your classmates.

Student answers will vary but may include:

- ***Limit or avoid exposure to sunscreen***
- ***Limit or avoid exposure to sun***
- ***Read labels so you know if sunscreen contains nanoparticles***
- ***Don't use sunscreen on burned skin***
- ***Support research on sunscreen hazards***
- ***Don't believe scare tactics***
- ***Compare hazards associated with sun exposure to hazards associated with exposure to sunscreen nanoparticles.***

7. Should manufacturers of sunscreens and other cosmetics be required to indicate that their product contains nanoparticles? Explain why or why not.

Student answers will vary. Allow time for class discussion.