**Chem 112 Nanoparticles Webquest Name: \_\_\_\_\_\_\_\_\_\_\_**

**What are the Big Questions?**

Should the makers of personal care products like sunscreen and cosmetics be able to add nanoparticles? If so to what extent should they be required to call them out on consumer product labels?

**Where do I find the answers?**

The answers will come from your brain (don't worry, your imagination will help), but I do have a plan in place to help you jumpstart your research and help you educate yourself about nanoparticles. Together with your group you will work through the following 5 sections to complete the WebQuest.

1. Introduction: Get to know the purpose of the WebQuest
2. Task: Read about and carefully consider the task at hand
3. Process: Evaluate the steps you need to follow to complete the task
4. Evaluation: We’ll both use this rubric - you to self-check your work and me to grade it
5. Conclusion: Final thoughts on the use of nanoparticles and product labeling, and thoughts on at least two other areas of similar (or potential) “chemical controversies.”

# Introductionsunscreen

Nanoparticles and nanotechnology are all the rage in the science community. They are being used to make everything from better scratch-free coatings for your sunglasses to cancer fighting medicines. Advocates for adding nanoparticles to consumer products claim they make products lighter, cleaner and more effective. The opposition claims they are potentially toxic to users and pose a threat to the environment.

### Consider the following scenarios...

* A mother buys a new sunscreen that touts better protection against UVA and UVB rays. The nanoparticles in the formula (not listed on the product label) cause her child to have a severe allergic reaction.
* An engineering lab discovers that silicon nanoparticles can be affixed to paper to create cheap, environmentally friendly electrical conductors.
* Medical studies have shown there may be adverse biochemical reactions to nanoparticles once they enter the human body like the creation of free radicals in the body that damage cells.
* Medical science predicts that in the not so distant future they will create tiny nanorobots, swarms of which could be injected into your bloodstream to identify and destroy everything from bacteria and viruses to cancerous growths.

These are the kinds of scenarios you will encounter as you explore the materials in this WebQuest. Notice I have cleverly included scenarios both for and against the use of nanoparticles. Life is seldom black and white or solved with easy answers. As you move through this WebQuest make sure to consider both sides of every argument as you balance cost against benefit.

# The Task

Your consulting firm has been asked to evaluate the benefits and dangers of including nanoparticles in the formulas for personal care products (sunscreen, cosmetics, etc.). Your client has been tasked by the FDA (Food and Drug Administration) to rule on whether it is safe to use nanoparticles in this way, and if so how they should be listed on product labels. Your report will ultimately be used by the FDA to create policy affecting personal care product manufacturers. To complete this task you will need to do some background research, collaborate with your peers, and come to a consensus on where you stand in order to produce a well-supported, documented recommendation.

### Your task "six pack"

1. Conduct your research.
2. Collaborate with your group.
3. Create a rough draft of your policy recommendation.
4. Share your recommendation with your peers and get feedback.
5. Check the rubric to self-check your policy draft.
6. Turn in your final policy recommendation for a grade.

# The Process, Step by Step

Remember, these are the six steps you need to do: 1) Conduct your research, 2) Collaborate with your group, 3) Create a rough draft of your policy recommendation, 4) Share your recommendation with your peers and get feedback, 5) Check the rubric to self-check your policy draft, and 6) Turn in your final policy recommendation for a grade.

## 1. Conduct your research

Before you start writing anything you need to educate yourself about nanoparticles, there uses, and their benefits and potential side effects. These will give you a good head start, but you will want to do some additional research on your own.

### Articles

What are Nanoparticles?

* <http://www.news-medical.net/health/Nanoparticles-What-are-Nanoparticles.aspx>
* <http://nanogloss.com/nanoparticles/what-are-nanoparticles/#axzz20hdxF0Ue>

How are They Used?

* <http://ec.europa.eu/health/opinions2/en/nanotechnologies/l-3/5-nanoparticles-consumer-products.htm>
* <http://www.understandingnano.com/nanoparticles.html>

Nanoparticles in Sunscreen and Cosmetics

* <http://www.rodale.com/nanoparticles-and-cosmetics>
* <http://www.news-medical.net/news/20110812/Benefits-of-nanoparticle-sunscreens-outweigh-risks.aspx>
* <http://www.wisegeek.com/what-are-the-pros-and-cons-of-nanoparticles-in-sunscreen.htm>

Which Top Cosmetics Brands Contain Nanoparticles?

* <http://nano.foe.org.au/nanoparticles-found-10-top-brand-cosmetics>

Are Nanoparticles Safe?

* <http://www.guardian.co.uk/science/2008/nov/05/cosmetics-beauty-nanoparticles-royal-society>
* <http://www.pbs.org/wgbh/nova/tech/maynard-nanotech-au.html>
* <http://www.wisegeek.com/what-are-the-possible-dangers-of-nanotechnology.htm>
* <http://www.fda.gov/ScienceResearch/SpecialTopics/Nanotechnology/default.htm>

The Labeling Debate

* <http://forcechange.com/13712/require-labels-on-cosmetic-products-containing-nanoparticles/>

### Video Clips

* "Nanoparticles in items you use everyday - are they safe, and why aren’t they better regulated?"<http://www.youtube.com/watch?v=ZSzohj9YCJA>
* Nanoparticles in the Environment: <http://www.youtube.com/watch?v=dEv3hmrsQD0>
* Nano materials, sunscreens and cosmetics - risks: <http://www.youtube.com/watch?v=PVBJ61sm7FA>
* Nanoparticles potentially harmful: <http://www.youtube.com/watch?v=9zspCb5mETc&feature=related>
* Macro concerns in a micro world: <http://www.youtube.com/watch?v=CMJ9kO3plu8&feature=related>
* Preventing Adverse Health Effects from Nanotechnology (by the Center for Disease Control) <http://www.youtube.com/watch?v=kBpQipD5KBg>

Internet Search:

Please do not rely on Wikipedia! It’s a good starting point, but please use Google, Bing or the school library database search to expand your research

## 2. Collaborate with Your Group

Your group will have one week to complete this project, so delegating the pieces and collaborating regularly is essential! During the week you will each need to post to your team’s forum at least twice this week.

## 3. Create a Rough Draft of Your Policy Recommendation

Write a rough draft of your recommendation. Remember to define nanoparticles, give examples of how and why they are used in personal care products (pros and cons) and address peripheral issues like environmental impact and labeling requirements. Make sure what you write could be used by an FDA representative to guide policy decisions. You may want to trade drafts with at least one other group member to get some early-stage feedback.

## 4. Share Your Recommendation With Your Peers/Get Feedback

Trade drafts with two of your peers (anyone in the class) and ask for feedback like “is the information I provided clear, relevant, and helpful? Could it help the FDA make decisions fair and balanced policies regarding inclusion of and labeling regarding nanoparticles in personal care products?

## 5. Self-Check Your Work Against the Rubric

I’ll be using the same rubric to grade your WebQuest, so I highly recommend you check your work along the way.

## 6. Turn in Your Final Policy Recommendation

Copy your document into the “Nano Project” folder on the G-Drive. Make sure all group member’s names appear on the title page of your document.

# WebQuest Evaluation Rubric

This is the rubric; no mystery here. The project is worth 60 points, so I suggest you refer to this frequently while working so you don't leave anything out. If you want me to check if you met a requirement before you turn in your final draft just ask. :-)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Exceeds Standards (90-100%)** | **Met Standards (70-89%)** | **Below Standards (0-69%)** |
| **Collaboration (5 points)** | Posted at least twice during the week about how the research was going; submitted you own research summary on time. | Posted at least once during the week about how the research was going; submitted your own research summary no more than one day late. | Did not post at all about how the research was going and/or your research summary was turned in more than one day late. |
| **General Content (30 points)** | Report covered all key points: definition of nanoparticles, their common uses, pros/cons, and recommendations on responsible labeling. | Report was missing one of the following key points: definition of nanoparticles, their common uses, pros/cons, and recommendations on responsible labeling. | Report was missing more than one of the following key points: definition of nanoparticles, their common uses, pros/cons, and recommendations on responsible labeling. |
| **Logic and Clarity (10 points)** | The report was organized in a logical sequence. It was easy to see your supporting evidence for all of the recommendations made. | The report was organized in a logical sequence, but it was difficult to see your supporting evidence for the recommendations made. | The report lacked a logical sequence and it was difficult or impossible to see the evidence that supported your recommendations. |
| **Mechanics (5 points)** | There were fewer than 3 spelling or grammatical errors in your document. | There were between 4-5 spelling or grammatical errors in your document. | There were more than 5 spelling or grammatical errors in your document. |
| **Your Conclusion (10 points)** | Your individual conclusion was thoughtful, displayed a high degree of critical thinking and offered a unique viewpoint. | Your individual conclusion did show some degree of higher order thinking but you did not provide much in the way of original opinion. | The conclusion was either missing altogether or was just a rehash of what was in your group paper with no original ideas. |

# Conclusion



In this WeqQuest you looked at the controversy surrounding using nanoparticles in personal care products like sunscreens and cosmetics. In addition to your formal group report you will each prepare a short, individual summary/conclusion that answers these questions: What about this topic surprised you and why? Did anything you learn change the way you feel about personal care products and how they are labeled? Can any product be considered universally “safe?” Why or why not? What other controversies did you come across (you should provide at least two). Who should decide how much product testing is needed before a product can be mass marketed? How quickly do we need to respond when problems with products are detected? What do we need to do? Who decides?

New technologies never emerge without controversy, and often the controversy never completely dies. You’re too young to remember, but adding fluoride to tap water a huge controversy in the 1970‘s, and its benefits and side effects are still being debated! Other controversies you may have heard: cell phones can cause brain cancer, diet soda can cause cancer, corn syrup is worse for you than sugar, and on and on it goes.

And another thing to consider? Is "bad" always bad enough? Just about everything has some adverse side effects for someone - some are even pretty severe - but where we lack safer alternatives sometimes anything is better than nothing. Don't believe me? Listen carefully for the disclaimers at the end of any drug commercial.

So as you answer the above questions also think about what (if anything) we can do to keep consumer products safer. Who has the upper hand in determining what is “safe,” science or government? Who is ultimately responsible for the choices we make? What choices can be made for us and by whom? **End of WebQuest**

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Thanks to Flicker contributor Bohemian Dolls for the picture of the sunburn. Nanoparticle image from www.fda.gov.