



Group Tasks

The group tasks are designed to give all students an overview of nanotechnology. The facilitator leads the group through each of the activities, encouraging additional discussion where possible. Each activity should last approximately 8-10 minutes in order to stay on schedule.

1. Definition and Scale

Objective: to explore the definition of nano and to gain an understanding of the nanoscale

Resources: Definition and Scale Resource Cards

Description: Students work with a mixed set of 18 cards. 6 of the cards have the name of a measurement prefix on them. 6 of the cards have the definitions of the associated prefixes on them. 6 of the cards have a visual image of an object at the associated scale on them (with a description if appropriate). Students work with the facilitator to create six columns of three matching cards each.

Nano	Micro	Milli	Kilo	Mega	Giga
10^{-9}	10^{-6}	10^{-3}	10^3	10^6	10^9
Iodine atoms	Bacteria	Sand	Canyon	Europe	Sun

2. Surface Area

Objective: to demonstrate the importance of the greater surface area that nanoparticles possess. To show that, in general, "smaller things react more".

Resources: Water, granular sugar and icing sugar. **OR.** Water, granular sugar and icing sugar. **OR.** Alka-seltzer tablet **OR.** Nothing

Description: The facilitator demonstrates the effects of surface area by placing two materials in different glasses and counting the time it takes to dissolve. If sugar resources are not available, the facilitator can show an alka seltzer tablet and show that in order to work quickly, it must be crushed to increase the surface area.

3. Nanoscience vs. Nanotechnology

Objective: to explore the difference between technology and science, and to extrapolate this to nanoscience and nanotechnology.



Resources: Science vs. Technology Resource Cards

Description: The group works with a mixed set of 13 cards. Through discussing and coming to a consensus, they must sort the cards into two appropriate piles. One pile contains the cards depicting science, and the other pile contains the cards depicting technology. At the completion of the activity the facilitator assists the group in creating and writing definitions for science, technology, nanoscience and nanotechnology.

Science		Technology	
Predicting the Weather	Huygen's Data	Vacuum Cleaners	Telescopes
Heart Surgery	DNA	Satellites	Mobile Phone
Natural Selection	What the stars are made of	Artificial Limbs	Huygen's probe
		Genetic Engineering	

4. Existing Applications

Objective: to examine and evaluate some of the real, proposed and purported applications of nanotechnology.

Resources: Future vs. Fiction Resource Cards

Description: The facilitator distributes a card to each member of the group. Each group in turn reads their card aloud to the others, which describes the possibilities of a nanotechnology application. The rest of the group then votes if the application can be classified as present, future, or fiction.

Present	Future	Fiction
Chemical particles in sunscreen	Cancer drug delivery	Pen Trackers



Carbon nanotubes	Light Paint	Robot Dentists
Computer chips	Sensors	
Cutting tools	Disease diagnosis	

5. Viewpoints

Objective: to critically evaluate existing print material that presents a view on nanotechnology

Resources: Viewpoint Resource Cards

Description: The facilitator distributes the viewpoint resource cards that each have an print image from various sources. The facilitator then leads a discussion on the group identifying the viewpoint of each of the sources, why the viewpoint might be held, and what techniques of language and image are used to present it.