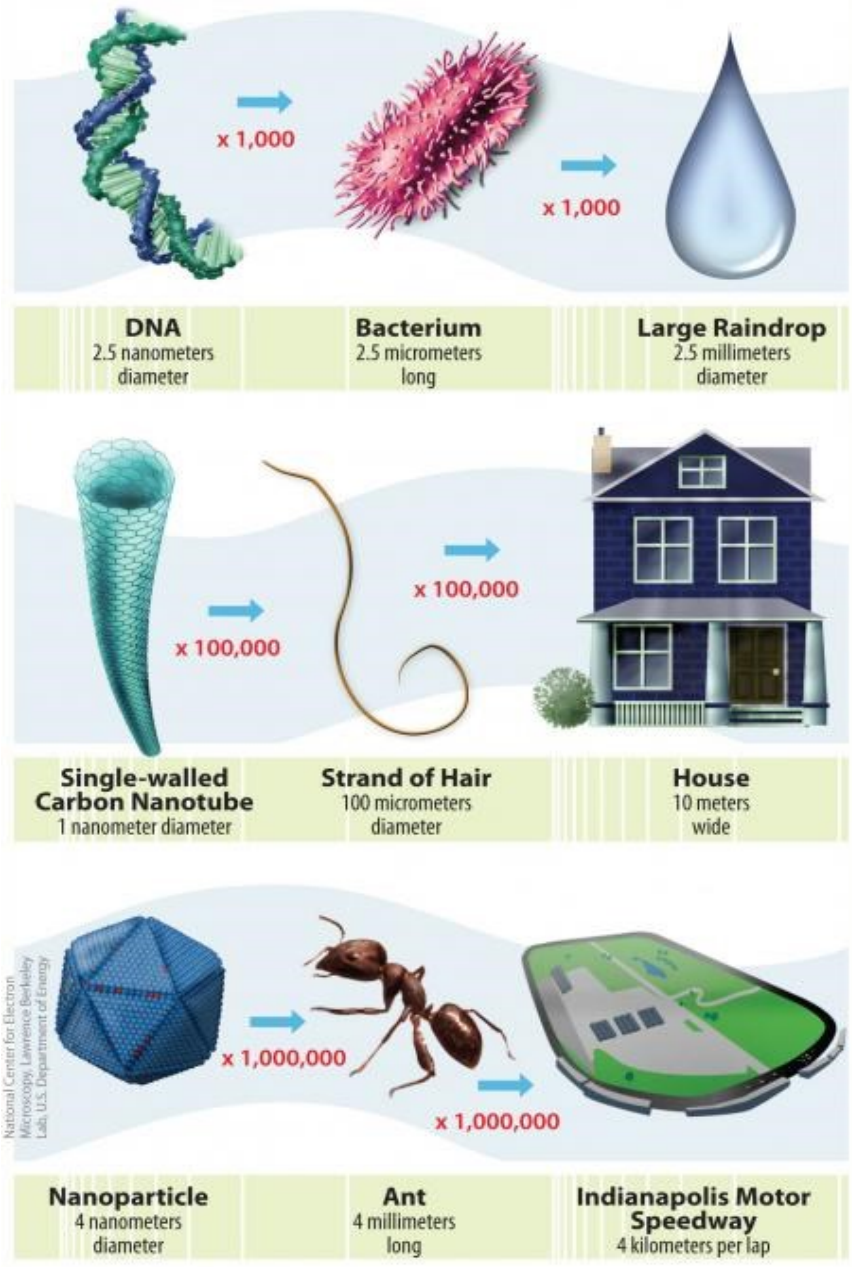
NNCI—Nanoscale Science and Engineering
Exploring Size and Scale

Explore!

1. Take the stack of image cards.
2. Sort from largest to smallest.
3. Compare your results with the answers.
4. How did you do? Did you have trouble as you moved to smaller objects?



Three examples of the size and scale of nanotechnology showing just how small things at the nanoscale actually are.

Image: http://www.nano.gove/nanotech-101/what/nano-size

Visit www.nnci.net

National Nanotechnology Coordinated Infrastructure

NNCI—Nanoscale Science and Engineering Exploring Forces– Gravity vs Intermolecular

Answers if using NNIN lesson at:

http://www.nnin.org/education-training/k-12-teachers/nanotechnology-curriculum-materials/size-and-scale-learning-about

Object	Approximate size
Atoms (3)	1nm
DNA (width)	2.5nm
Influenza virus (diameter)	20nm
Anthrax bacteria	1µm
Red bool cell	7µm
Pollen grain	30µm
Hair diameter	60-80µm
Grain of sand	.5mm
Dime thickness	1mm
Head of a pin	2mm
Flea	2.5mm
Yellow jacket	12.7mm
Apple	76mm
iPod length	90mm
Field mouse (average length)	152mm
Soccer ball	254mm
Cat (average length)	.45m
Dalmatian (average length)	1m
Bike in a bag (length)	1.30m
Hummer H1	4.7m
Driveway (average length)	15.2m
Football field (length)	110m
Boeing 767 400ER	64m
Queen Mary II	345m
Airport runway	3.35km

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Answers if using Nanosense lesson at:

http://nanosense.sri.com/activities/sizematters/sizeandscale/SM_Lesson2Teacher.pdf

- Nucleus of an oxygen atom
- Diameter of a nitrogen atom
- Width of a water molecule
- Diameter of a carbon nanotube
- Width of a proteinase enzyme
- Diameter of a ribosome
- Diameter of a virus
- Wavelength of visible light
- Width of a bacterium
- Diameter of a red blood cell
- Length of a human muscle cell
- Length of an amoeba
- Length of a dust mite
- Thickness of sewing thread
- Thickness of a staple
- Thickness of a penny
- Length of an apple seed
- Width of a typical wedding ring
- Diameter of a quarter
- Width of an electrical outlet cover
- Length of a business envelope
- Length of a phone book
- Height of a typical 5-year-old Child
- Height of a typical NBA player