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# Origin and Fundamental Concepts of Nanotechnology

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## Introduction

Nanotechnology, also abbreviated as nanotech, is the use of matter on an atomic, molecular, and molecules scale for industrial applications. The first pervasive description of nanomaterial's made reference to the particular technical goal of precisely manipulating atoms for the fabrication of macroscopic scales products, which is now known as nano technology. The national nanotechnology action plan later defined nanostructures as the particles with at least in one dimension sized from 1 nm to 100 nm. This meaning highlights the fact that quantum theory effects are essential at this quantum realm scale, and thus the meaning shifted from a specific technological goal to a research category inclusive of all kinds of research and innovations that deal with the special states of materials that occur underneath the given size threshold. As a result, the plural form "nanotechnologies" as well as "nano scale technologies" are commonly used to refer to the broad variety of studies and applications that share the common characteristic of size. Surface science, natural science, cell genetics, semiconductor physics, energy storage, engineering, micro fabrication, and nano are all examples of nanotechnology as defined by size, the affiliated research areas are extremely diverse, ranging from extenders of traditional device physics to entirely new approaches based on molecular self-assembly, from developing products with nanometer level to guide control of matter on an atomic magnitude.

## Description

Nanotechnology's prospective consequences are currently being debated by scientists. Nanotechnology has the opportunity to generate many materials and devices with numerous applications, including nanoparticles, nanotechnology, biomaterials, energy production, and consumer goods. Nanotechnology, on the other hand, raises most of the same concerns as any new technology, such as concerns about the toxicity and environmental impact of nanoparticles, their potential effects on global economics, and supposition about numerous apocalyptic predictions. These concerns have sparked a debate among advocacy groups and governments as to whether nanotechnology requires special regulation. The engineering of functionalities at the microscopic level is known as nanotechnology. This includes both current work and more advanced topics. Nanotechnology, in its original sense, refers to the predicted ability to build items from the ground up, using techniques and tools that are currently being built to create complete, elevated products. One micrometre (nm) is one billionth of a meter (109) In comparison, typical dioxide bond lengths, or the layout between such atoms in the molecule, are in the 0.12–0.15 nm range, and the diameter of a DNA double helix is around 2 nm. The smallest multi celled, on either hand, are bacteria of the genus Mycoplasma, which measure around 200 nm in length. Nanomaterial's is commonly defined as a scale ranging from 1 to 100 nm, as indicated by the national nanotechnology action plan in the United States. Because nanotechnology must construct its devices from atoms, the lower limit is set by the size of atoms (hydrogen has the smallest atoms, which are roughly a quarter of a nm kinetic diameter). The upper limit is more or less random, but it is around the size below which phenomena not seen in larger structures become evident and can be used in the nano device. These new phenomena distinguish nanotechnology from devices that are simply miniaturized versions of comparable subatomic devices; such devices are on a larger scale and are classified as micro technology.

## Conclusion

In conclusion to put that scale in context, the size of a nonmetric in comparison to a meter is the same as the size of a marble in comparison to the size of the earth. In other words, a nanometer is the quantity of hair that grows on the average person's hair in the time it takes him to start raising the beard trimmer. In nanotechnology, two main approaches are used. Materials are built from molecular components that connect themself molecularly using molecular recognition principles in the "bottom-up" approach. Nano-objects are built from larger entities without atomic-level regulation in the "top-down" strategy.

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