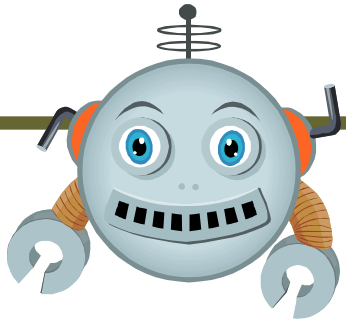
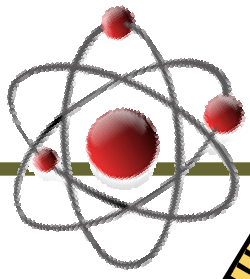
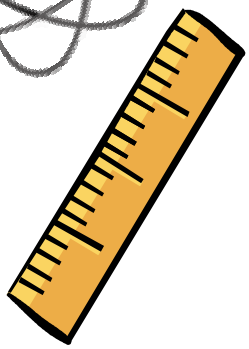
science FRONTIERS







Honey, Everything Shrunk
(Nanotechnology)

Nano is the prefix for 1 billionth (10^{-9}). One nanometer, or 1 billionth of a meter, is about 10 atoms long. The human hair is about 70,000 nanometers wide. Nanotechnology refers to the manipulation of atoms and molecules to produce new and improved products. It generally refers to products which are about 1-100 nanometers in size.

Nanotechnology is being used in chemistry to produce chemical compounds that have exact chemical and physical structures. Lubricants can be slicker because they don't contain some of the contaminants found in natural lubricants, such as petroleum. Pharmaceuticals can be structured to exactly match the target invader or receptor site. Biologists are developing **nanorobots** *(miniature sensors),* devices that can be injected into humans to find and repair damaged organs, tissue, and cells.

Engineers are developing materials having increased strength, less weight, controlled flexibility, and other characteristics to improve our lives. Paint that repairs itself after being scratched, cloth that changes its capacity to insulate when the outside temperature changes, and snowboards that modify the friction of the bottom surface with changing snow conditions, are examples of practical uses of nanotechnology.

Nanotechnology can be applied to microprocessors. Quantum computing controls the direction that electrons spin to create binary switches now produced with larger atoms and molecules. USB drives and MP_3 players which can store thousands of songs are examples of other uses of nanotechnology.

Questions for research:

What might you have at home that uses nanotechnology?
As you think of other, future uses for nanotechnology,
what do you think may be a new invention?
Ellen G. White wrote that Adam and Eve could see details up close and far away that we cannot see. If you had super microscopic vision, how would you use it to help others?

Research Ideas

Lubricants, biosensors, DNA nanotubes