

<p>Q: How many nanometers are in a meter?</p> <p>A: One billion</p>	<p>Q: What is nanotechnology?</p> <p>a. the science of ants b. the art of manipulating materials on a very small scale in order to build microscopic devices c. the process of teasing by saying "nah nah nah nah"</p> <p>A: b</p>	<p>Q: How many carbon atoms are in a buckyball?</p> <p>A: 60</p>	<p>Q: Who was the first company or person to see C60?</p> <p>A: Exxon Corporation</p>	<p>Quantum Mechanics assumes that photons are packets of light that behave not only like waves but also like ____.</p> <p>Particles</p>	<p>Quantum Mechanics assumes that electrons behave not only like particles but also like ____.</p> <p>Waves</p>
<p>Q: What are buckyballs made of?</p> <p>a. Lemonade with nanoscale crystallites b. Leather treated with a nanoscale foam c. Carbon atoms</p> <p>A: c</p>	<p>Q: How much carbon is in a C60 molecule?</p> <p>a. 1802 b. 60 atoms c. 6,515,384 liters</p> <p>A: b. 60 carbon atoms</p>	<p>Q: About how many nanometers wide is a human hair?</p> <p>a. 75,000 nm b. 750,000 nm c. 7,555,555 nm</p> <p>A. a.</p>	<p>Q: What is a clear, crystal form of carbon?</p> <p>a. diamonds b. glass c. plastic</p> <p>A: a diamonds</p>	<p>The Quantum Mechanics assumption that particles may be regarded as countable packets of wave is known as ____.</p> <p>Wave-Particle Duality</p>	<p>The observation that electrons ejected from metal were dependent on the color of light but not the intensity, which could not be explained by classical physics resulted in development of ____.</p> <p>Quantum Mechanics</p>
<p>Q: What shapes make up a buckyball?</p> <p>a. 6 hexagons and 18 octagons b. 12 pentagons and 20 hexagons c. 12 squares and 24 hexagons</p> <p>A: b</p>	<p>The link between Heisenberg's Quantum Mechanics world and Newton's Classical Mechanics world is called the ____.</p> <p>Correspondence Principle</p>	<p>Q. Roughly how many distinct atoms (elements) are there?</p> <p>a. 10 b. 100 c. 1000</p> <p>A. b</p>	<p>The central core of an atom is a cluster of protons and neutrons known as the ____.</p> <p>Nucleus</p>	<p>True or False – Sodium, an element in the compound sodium-chloride (table salt), is a metal that reacts violently in air.</p> <p>True</p>	<p>True or False Chlorine, an element in the compound sodium-chloride (table salt), by itself forms a lethal gas.</p> <p>True</p>
<p>Q. Roughly how many atoms are there in a protein molecule?</p> <p>a. 100 b. 1,000 c. 1,000,000</p> <p>A. c</p>	<p>Q. Roughly how many atoms are there in a DNA molecule?</p> <p>a. 100 b. 1,000 c. 1,000,000</p> <p>A. c</p>	<p>Q. What element exists in roughly ninety percent of all known chemical substances?</p> <p>a. Carbon b. Nitrogen c. Silicon</p> <p>A. a Carbon</p>	<p>Q. Which element forms perfect crystal structures of graphite and diamonds.</p> <p>a. Carbon b. Nitrogen c. Oxygen</p> <p>A. a Carbon</p>	<p>Q. How many hydrogen atoms are in a single water molecule?</p> <p>a. 1 b. 2 c. 3</p> <p>A. b (2 Hydrogen atoms)</p>	<p>What is the molecule that governs heredity called?</p> <p>A: DNA</p>

<p>Nanoscale materials are nanoscale in:</p> <ol style="list-style-type: none"> one dimension - a thin surface coating two dimensions - nanowires three dimensions - nanopowders all of the above <p>A: d all of the above</p>	<p>Quantum effects that dominate the characteristics of matter at the nanoscale can affect:</p> <ol style="list-style-type: none"> optical properties electrical properties magnetic properties all of the above <p>A: d all of the above</p>	<p>True or False: Some materials are inert in large form and reactive in nanoscale form because at nanoscale they are more chemically reactive.</p> <p>A: True</p>	<p>True or False: A gram of carbon black has a larger surface area when in bulk form than when formed as nanoparticles.</p> <p>A: False</p>	<p>True or False: When the surface area of matter is increased, it can become more chemically reactive.</p> <p>A: True</p>	<p>True or False: Nanoparticles are less chemically reactive than when in macroscopic form.</p> <p>A: False</p>
<p>The width of a human hair is approximately:</p> <ol style="list-style-type: none"> 850 nm 8,500 nm 85,000 nm 850,000 nm <p>A: c 85,000 nm</p>	<p>The width of a single red blood cell is approximately:</p> <ol style="list-style-type: none"> 700 nm 7,000 nm 70,000 nm 700,000 nm <p>A: b 7,000 nm</p>	<p>The width of a water molecule is approximately:</p> <ol style="list-style-type: none"> three hundredths of a nanometer three tenths of a nanometer three nanometers thirty nanometers <p>A: b three tenths</p>	<p>Nanoscience involves manipulation of materials at what scale:</p> <ol style="list-style-type: none"> atomic molecular macromolecular all of the above <p>A: d all of the above</p>	<p>Which of the following is not nanoscale in three dimensions:</p> <ol style="list-style-type: none"> quantum dot nanowire colloid nanocrystalline material <p>A: b nanowires</p>	<p>Which of the following is nanoscale in only two dimensions:</p> <ol style="list-style-type: none"> quantum dot nanowire colloid buckeyball <p>A: b nanowires</p>
<p>Which of the following is nanoscale in only one dimensions:</p> <ol style="list-style-type: none"> quantum dot nanowire thin film buckeyball <p>A: c thin film</p>	<p>True or False On the surface of a particle of size 30 nm are 5% of the total number of atoms, at 10 nm are 20% of its atoms, and at 3 nm are 50% of its atoms.</p> <p>A: True</p>	<p>True or False As a spherical snowball melts, the surface area to volume ratio increases inversely proportional to its radius.</p> <p>A: True</p>	<p>Dendrimers are spherical polymeric molecules usually created by:</p> <ol style="list-style-type: none"> salt and vinegar self-assembly top-down processes <p>A: b</p>	<p>How many atoms fit on a straight line 1 nanometer long?</p> <ol style="list-style-type: none"> 1 to 2 atoms 8 to 10 atoms 50 to 60 atoms 100 to 120 atoms <p>A: b between 8 and 10 atoms</p>	<p>The process by which a bulk material is reduced in size to nanoscale pattern is called:</p> <ol style="list-style-type: none"> top-down assembly bottom-up assembly self assembly <p>A: a. top-down</p>
<p>The process by which larger structures are built or grown atom by atom or molecule by molecule is called:</p> <ol style="list-style-type: none"> top-down assembly bottom-up assembly self assembly <p>A: b bottom-up</p>	<p>True or False Copper, which is opaque in bulk structures, becomes transparent at nanoscales.</p> <p>A: True</p>	<p>True or False Bulk platinum is inert – meaning it doesn't react with other materials. But at nanoscales it becomes a catalyst.</p> <p>A: True</p>	<p>True or False Aluminum is a stable solid, and doesn't readily combust at any scale.</p> <p>A: False at nanoscales aluminum becomes combustible.</p>	<p>True or False At room temperature gold is solid, except at nanoscales – it becomes a liquid.</p> <p>A: True</p>	<p>True or False Silicon is an insulator at all sizes – bulk or nanoscale.</p> <p>A: False in bulk silicon is an insulator; at nanoscales it is a conductor.</p>