Environmental Science Institute
THE UNIVERSITY OF TEXAS AT AUSTIN

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Learning Modules

What is Solar Energy?
Solar Energy is the energy (useable power) from the Sun. The Sun is a source of heat and light resulting from nuclear fusion at its core. The nuclear reaction releases energy that travels outward to the surface of the Sun. Along the way to the surface, the energy transforms so that by the time it is released it is primarily light energy, known as sunlight. The two major types of solar energy that make it to Earth are heat and light.

Source: Solar Energy Information – Make It Solar Science Fair Topics and Projects
- URL: http://www.makeitsolar.com/solar-energy-information/02-solar-energy.htm

What is Nanotechnology?
The design, characterization, production, and application of structures, devices, and systems by controlled manipulation of size and shape at the nanometer scale (atomic, molecular, and macromolecular scale) that produces structures, devices, and systems with at least one novel/superior characteristic or property.

Source: Nano Werk
- URL: http://www.nanowerk.com/nanotechnology/introduction/introduction_to_nanotechnology_1.html

What are Colloidal Nanocrystals?
Colloidal nanocrystals, sometimes referred to as "artificial atoms," are solution-grown, nanometer-sized inorganic particles that are stabilized by a layer of surfactants (surface-active agents) attached to their surface. The inorganic cores possess useful properties that are controlled by their composition, size and shape, and the surfactant coating ensures that these structures are easy to fabricate and process further into more complex structures. This combination of features makes colloidal nanocrystals attractive and promising building blocks for advanced materials and devices. They are bright, colorful, and do not photo-bleach. Chemists are achieving ever more exquisite control over the composition, size, shape, crystal structure and surface properties of nanocrystals, thus setting the stage for fully exploiting the potential of these remarkable materials. The combination of low-cost processing and solid-state performance make these attractive alternatives to semiconductor polymers in light emitting diodes, lasers, and solar cells.

Source: npg – Nature publishing group
- URL: http://www.nature.com/nature/journal/v437/n7059/full/nature04165.html

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What are Photovoltaic Cells (or solar cells)?
Photovoltaic cells produce usable electric current, using energy in the form of photons. These cells are commonly known as solar cells or PV. These cells form an electric current in which electrons go in a circular pattern, and do not alternate direction. This is similar to the power of a battery, as opposed to the power of a power plant. This direct current can be converted to alternating current for homes and industrial uses.

Solar cells are not found alone but grouped together in series, to form what is called a solar array. These are generally placed under glass or plastic for protection from the weather. When hooked in series, a lot more electricity is generated.

Source: Photovoltaics – In a High School Lab
- URL: http://www.botproductions.com/pv/what.html

What is a Nanoparticle?
A nanoparticle is a unit defined as a small object that behaves as a whole in terms of its transport and properties. Nanoparticles are between 1 and 100 nanometers in diameter.

Source: The Medical News
- URL: http://www.news-medical.net/health/Nanoparticles-What-are-Nanoparticles.aspx