



## One-day Workshop

### A Look into the Nano World: Relationship to Biology, Chemistry, Physics, & General Science

1. Introductions
  - a. Teacher & class profiles
2. Today's Objectives
3. Discussion of Pre-Quiz
4. Discussion of 1959 Feynman article introducing the nanotechnology field
5. PowerPoint overview of nanotechnology & applications
6. The Nano Scale: *Powers of 10*, micron, nanometer, Angstrom
7. Experiment 1- Unique optical properties on the nano scale: Colloidal Au
  - a. Tyndall Effect
  - b. Au Colloid color-observation & explanation
  - c. Tele-experimentation demonstration: Using a computer interface (NTEN), run UV spectrometer at Immaculata University to measure colloidal gold absorption spectrum
  - d. Applications
  - e. Lesson Plan
8. Experiment 2- Consequences of size, effect of surface area on reactivity
  - a. Physical-Ice, solid & crushed
  - b. Chemical-Baking soda, vinegar, tablet & powder
  - c. Applications
  - d. Lesson Plan
9. New Nano Materials-description and uses
  - a. Quantum Dots, colloidal metals
    - i. Disease diagnosis & treatment, light emission
  - b. Nanotubes
    - i. Ultrastrong materials, unique electrical properties, miniaturization of circuits, drug delivery
  - c. Giant Magnetoresistance-application to computer memory
  - d. Ferrofluids, Nnaomachines, Nanorobotics in medicine
10. Nanotech Products in the marketplace
11. Nanotechnology risk & risk perception
12. Careers in Nanotechnology
13. Incorporation of concepts in the classroom; correlation to academic standards and assessment anchors
14. Workshop evaluation