

# Nanoscale Curriculum Integration in the High School Classroom

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## Introduction:

Hillwood High School is a large urban comprehensive high school of the Metropolitan Nashville public school system. The enrollment is 1,475 and serves grades 9 to 12.

Student background; 60% female, 40% male. 40% white, 50% black, 10% Asian.

## Nano-Modules:

- Same Materials---different behavior
- Powers of 10 and scale
- Surface area and volume

A design project:

Purification of water using ZnO nano-particles

## Effectiveness:

- a. The students learned some basic concepts of nanosciences.
- b. The students were always interested in the demonstrations and hands-on activities.
- c. The NCLT modules were very effective for students understanding of the basic concepts of nanosciences, such as scale and volume
- d. The students were very interested in the design project, but some technical issues need to be improved.
- e. The students generally understood that “nano” is “small”, and “small” may lead to “new properties”.

## Suggestions and concerns:

- Integrate the nano-modules with the standard test curricula, such as the gateway tests?
- Develop effective tools for the concepts “seen” vs “Imaged”.
- Help students to understand the concepts “small” vs “nano”.
- Develop nano-biological curriculum for high school.
- Find more teaching materials for “Nano in everyday”.
- Develop new curriculum to incorporate into Environmental Science classes.

## Students in the NCLT Implementation Classes:

Class one: I.B. Biology II, 25 students, 11<sup>th</sup> grade

Class two: Regular Biology I, 23 students, 10<sup>th</sup> grade

Class three: Regular Biology I, 14 students, 10<sup>th</sup> grade

Total of students; 62 students

## Classroom activities:

- Lectures.
- Poster prepared and presented by the students (2-3 students as a group).
- Experiments and activities led by the students.
- Demonstrations led by the teacher.
- Design project prepared and tested by students.

## Plan for the 07-08 academic year:

a. Effectively integrate the nano-modules with my courses (I.B. Biology II, Regular Biology I and A.P. Environmental Science)

b. Work with Fisk/NWU/PU team on improving the design project.

The project could fit the environmental science course perfectly with some changes in applications.

c. Work with the team and disseminate our results and findings.

