



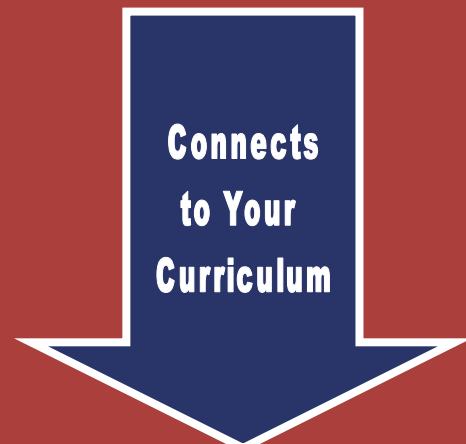
NANOSCALE DRUG DELIVERY

Nanotechnology is applied to create targeted delivery of nanomedicine for localized treatment.

Students learn how nanotechnology is revolutionizing the approach to drug delivery and diagnostics. They are engaged in a simulated, as well as hands-on experience, in designing nanomedicine for targeted delivery. Students are challenged to design a nanodrug with an optimum time-release profile.

By incorporating everyday materials into science lessons, the Materials World Modules (MWM) program at Northwestern University has found the solution to getting students excited about learning science while helping teachers meet national and state education standards.

The modules are easy to organize and inexpensive to use. They can be incorporated into any science class because of the breadth of subjects covered in the Activity and Design Project sections. Each module is a supplemental science unit that takes 1-3 weeks of class time (approximately 10 hours) to complete.



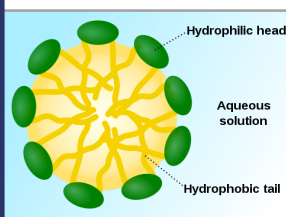
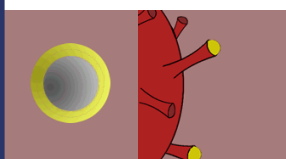
Module At-a-Glance:

Activities

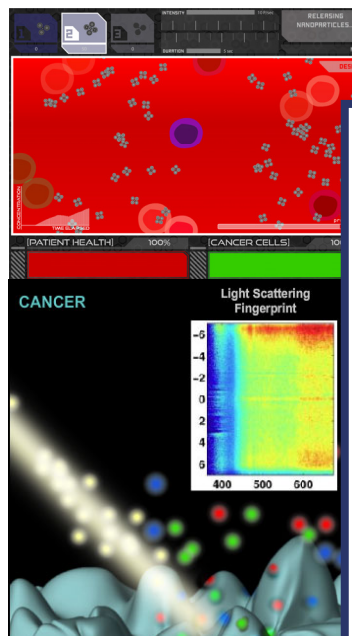
- Game: Designing a Search and Destroy Nanomedicine
- Hunting for Drug Delivery Systems that Use Nanoparticles
- Making Biodegradable Alginate “Drug” Capsules
- Determining the Rate of “Drug” Release

Design Project

- Designing a Fast Acting, Time-Release Nanomedicine



MWM will give students an opportunity to understand the world around them in a way they have never experienced before. The modules promote an awareness of the roles science and technology play in society and guide students to take increased control of their work.



MWM is designed to improve STEM education

Science ■ Technology ■ Engineering ■ Math

Interdisciplinary
Integrates science & non-science subjects

Flexible
Can adapt to your teaching style, students' ability and class time

Hands-on
Contains activities that lead up to inquiry-centered design projects

Cutting-edge
Examines issues at the forefront of technological research

Chemistry

- Structure and Properties of Matter
 - Atomic Theory ■ Bonding ■
- Solutions, Colloids, and Suspensions ■
- Organic Chemistry ■ Reaction Kinetics ■
- Biochemical Reactions ■

Biology & Life Sciences

- Cell Biology ■ Biochemistry
- Diseases ■ Immune System ■ Drugs ■
- Molecular Biology ■ Biotechnology

Mathematics

- Measuring ■ Graphing (Making, Reading and Interpreting) ■ Computing
- Averages ■ Rates ■ Orders of Magnitude ■ Size and Scale ■ Surface-to-Volume Ratios ■ Mathematical Modeling

Physics & Physical Sciences

- Properties of Matter ■ Physical and Chemical Changes ■ Colors and Light ■
- Spectrophotometry

Society

- Ethics and Impact of Uses of Nanotechnology

Technology/Engineering Education

- Iterative Design ■ Building Prototypes ■
- Optimization ■ Communications

Language Arts

- Writing a Report ■ Public Speaking

Materials World Modules

An Inquiry & Design Based STEM Education Program

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