BIOSENSORS

Biosensors – basic biological processes transformed into sophisticated advances in biotechnology.

Students investigate the use of biological molecules as materials and use enzymes as chemical sensors in the design of diagnostic tests for peroxide, cholesterol, and glucose.

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 run. 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.

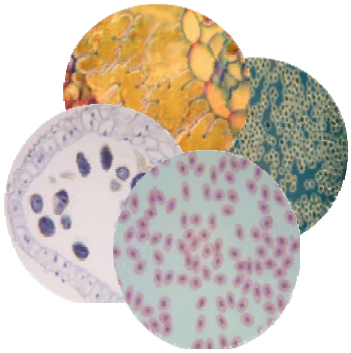
Module At-a-Glance:

Activities

- Investigating Biological Molecules and Bioluminescence
- Investigating Enzymes
- Making a Peroxide Biosensor
- Testing a Cholesterol Biosensor
- Evaluating a Home-Use Cholesterol Biosensor

Design Project

- Designing a Glucose Biosensor



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's key ingredients -

Interdisciplinary
Integrates science & non-science subjects

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

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

Cutting-edge
Introduces issues on the forefront of technological research

for improving STEM education
Science ▪ Technology ▪ Engineering ▪ Math

Materials World Modules
An Inquiry & Design Based STEM Education Program
Northwestern University ■ www.materialsworldmodules.org
847-467-2489 ■ mwm@northwestern.edu

Connects to Your Curriculum

Chemistry
Chemiluminescence ■ Enzymes ■ Catalysts ■ Chemical Reactions ■ Reaction rates ■ Proteins ■ Oxidation-reduction Reactions ■ Paper Chromatography ■ Making Sequential Dilutions ■ Solubility and concentrations ■ Lipids

Biology & Life Sciences
Bioluminescence ■ Biological Molecules ■ Enzymes ■ Linked Enzymatic Reactions ■ Proteins ■ Sensing Light and Color ■ Cholesterol ■ Atherosclerosis

Mathematics
Calculating Ratios ■ Slope-intercept Formula ■ Interpreting Graphs ■ Calculating Concentrations

Physics & Physical Sciences
Light ■ Color ■ Luminescent Indicators ■ Electromagnetic Spectrum ■ Colorimetric Indicators ■ Atomic Structure and Energy States

Health
Cholesterol in the Diet ■ Cardiovascular Disease ■ Lowering Cholesterol Levels ■ Health-care Technology

Career Education
Careers in Health Care ■

Language Arts
■ Writing a Report ■ Public Speaking