



# COMPOSITES

**Tires, sports equipment, formica, and cardboard. Do you recognize other composite materials you use every day?**

Students find out what composite materials are and test them to learn their advantages over pure materials. They design a prototype composite material to make a strong, lightweight fishing pole.

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

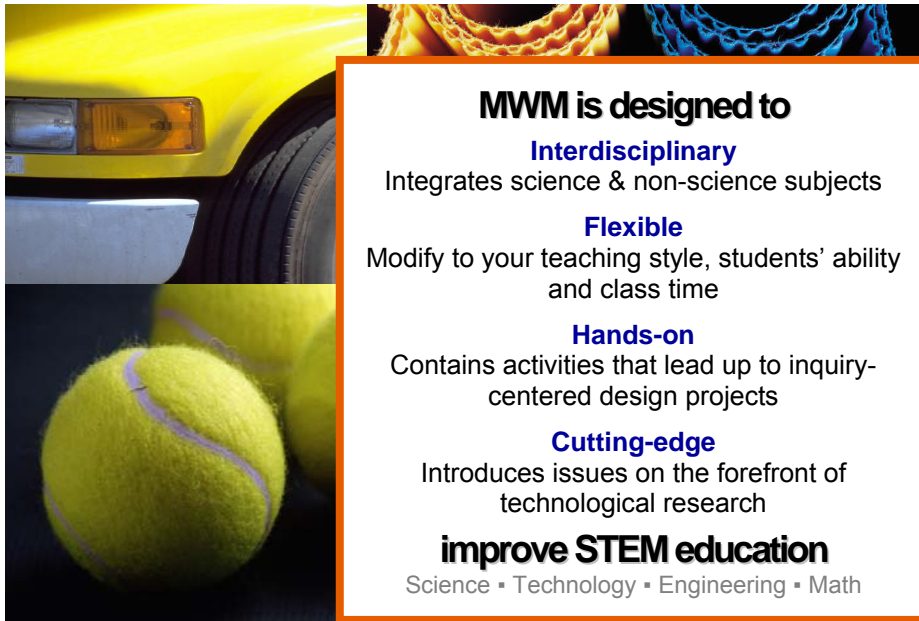
- Testing Different Kinds of Ice
- Hunting for Composite Materials
- Exploring the Difference Between Strength and Stiffness
- Testing a Foam Composite
- Researching Composites

### Design Project

- Designing a Fishing Pole
- Designing a New Material



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**

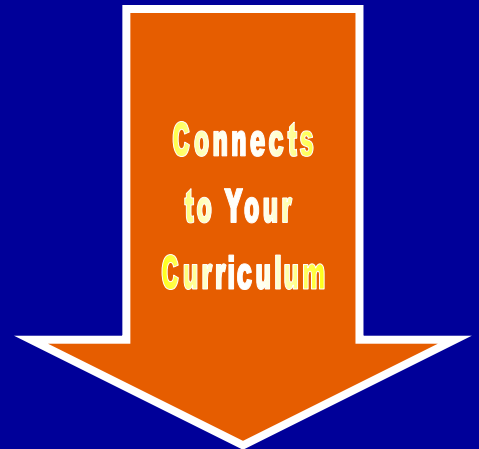
**Interdisciplinary**  
Integrates science & non-science subjects

**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

**improve STEM education**  
Science • Technology • Engineering • Math



## Chemistry

Structures of Solids ■ Carbon-based Materials ■ Polymers ■ Structure of Molecules ■ Bonding ■ Metallic Bonds ■ Covalent Bonds ■ Van der Waals Forces

## Biology & Life Sciences

Structure and Function ■ Bones ■ Muscles ■ Connective Tissues ■ Wings and Feathers ■ Leaves ■ Stems ■ Roots

## Mathematics

Measuring ■ Graphing (Making, Reading and Analyzing) ■ Making Scale Models ■ Standard Deviations

## Physics & Physical Sciences

Forces ■ Loads and Stresses ■ Tensile and Compressive Forces ■ Torque ■ Elastic Interactions ■ Vectors

## Geology & Earth Science

Formation and Composition of Rocks ■ Sedimentary Rock ■ Metamorphic Intrusions ■ Mining and Using Mineral Resources ■ Rock as a Building Material ■ Petroleum Products

## Technical Education

Designing and Drafting ■ Planning and Drawing ■ Evaluating Efficiency ■ Cost/Benefit Analysis ■ Quality Control ■ Materials ■ Woods ■ Metals ■ Plastics ■ Lamination ■ Structures and Codes ■ Aircraft Construction ■ Suspension Systems ■ Body Shop

## Language Arts

■ Writing a report ■ Public speaking

## Materials World Modules

**An Inquiry & Design Based STEM Education Program**

Northwestern University ■ [www.materialsworldmodules.org](http://www.materialsworldmodules.org)  
847-467-2489 ■ [mwm@northwestern.edu](mailto:mwm@northwestern.edu)

