



# SPORTS MATERIALS

Today's lesson: basketball, soccer, baseball, golf, and tennis – and this isn't gym class!

Students explore the design and function of a wide variety of balls used in athletics, as well as test and analyze their interactions with many surfaces they come in contact during play. Then students design a suitable material for use in a newly invented game.

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

- Exploring Ball Design and Materials
- Measuring the Rebound of Sports Balls
- Investigating Energy Absorption
- Comparing Rolling Friction
- Researching Sports Materials

### Design Project

- Designing a Mini-Golf Game
- Designing New Sports Equipment



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

## 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)



Connects  
to Your  
Curriculum

### Chemistry

Properties of Matter ■  
Molecular Bonds ■ Polymers

### Biology & Life Sciences

Biological Materials ■ Structure and  
Function ■ Biomechanics  
■ Human Body ■ Joints ■  
Metabolism ■ Skin

### Mathematics

■ Measuring ■ Graphing (Making and  
Interpreting) ■ Computing ■ Averages ■  
Ratios ■ Percentages

### Physics & Physical Sciences

Forces ■ Friction ■ Energy ■ Conservation  
of Energy ■ Energy Absorption ■  
Stored and Kinetic Energy ■  
Elastic and Plastic Deformation ■ Inertia

### Geology & Earth Science

Air pressure and Altitude ■  
Environmental Issues

### Technical Education

Designing ■ Materials ■ Controlling Energy  
Absorption Controlling Friction

### Language Arts

■ Writing a report ■ Public speaking