



# A Guide to Sparking Excitement for STEM





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Molecular Explorers™ is an educational approach that uses a variety of resources to engage students in learning about the molecular world. The program is designed to be used in a variety of ways, including as a stand-alone program or as a supplement to other science courses.

**Download the Teachers' Guide**

Download the Teachers' Guide for Molecular Explorers™ and get everything you need to get started. The guide includes a variety of resources, including lesson plans, activities, and assessments.

**Using the Program**

Learn how to best fit the program into your classroom. Access online resources or use the program as a stand-alone curriculum.

**Provide Feedback**

Let us know how you like the program. We want to hear from you so we can make the program even better.

Molecular Explorers™ is an educational approach initiative of the  
Molecular, Materials, and Materials Society.

**TMS**  
The Society, There is a Science Society

Molecular Explorers™ is made possible through the  
Botticelli  
Foundation  
Jeffrey W. Warkentin  
and Family.

The TMS Foundation

Each module is made up of a classroom activity designed to be low cost and easy to implement, plus an extension activity to highlight a broader application of the topic being discussed.

Modules are all clearly marked with what you can expect:

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- Download Teachers Guide
- Download the Complete Teacher's Guide
- Complete Teacher's Guide
- Download Teacher's Guide by Module
- Additive Manufacturing
- 3D printing
  - 3D scanning
  - 3D printing
- Download Teacher's Guide by Module
- Additive Manufacturing
- 3D printing
  - 3D scanning
  - 3D printing

*Materials Explorers™* activities support a range of STEM subjects from biology to physics. The keywords for each activity clearly indicate which classroom settings may be most appropriate for a particular module.

You can use the classroom activity, extension activity, or both – *Materials Explorers™* is designed to be completely customizable to your needs.

Teacher's Guides also contains answer keys and grading rubrics to make covering each topic as easy as possible.



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## Download the Free Student Handout

Navigate to the Student section of the website where you'll find student handouts to accompany each *Materials Explorers™* module.

These handouts are free of answer keys and are easy to distribute as a printout or as a digital download.

You can also direct your students to the website's "Extra Resources" section where they can view a variety of background readings or thought-provoking expansion topics.

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## Request a Visit from a Volunteer Scientist

Meeting a real scientist or engineer makes it easier for students to picture themselves in that role.

Navigate to the "Using the Program" section of [www.materials-explorers.org/Teachers](http://www.materials-explorers.org/Teachers) to complete a brief form requesting a classroom visit from a local scientist or engineer. If there's a registered *Materials Explorers™* ambassador in your area, you'll be contacted to arrange a visit.

All volunteers are members of The Minerals, Metals & Materials Society: a professional association of materials scientists and engineers from all over the globe. These dedicated individuals work in industry, academia, and government laboratories and can speak from personal experience about the way science and engineering influences students' everyday lives.

**ATERIALS  
EXPLORERS™**

**PHONES**



can't imagine life without your smartphone. You use it to make the device that never leaves your side. But what if you could make the device that never leaves your side? This is the challenge created by a release on from the leading engineering school physical science program.

**MATERIALS  
EXPLORERS™**

**STRUCTURAL MATERIALS**



of automotive parts to billions, the world is full of products designed to hold together. But what if you could make the device that never leaves your side? This is the challenge created by a release on from the leading engineering school physical science program.

**MATERIALS  
EXPLORERS™**

**MATERIALS THAT MOVE US:  
PUTTING IT ALL TOGETHER**



Materials Explorers™ you've seen the importance of materials selection in a product. You've also learned about the scientific method, a logical approach to problem solving. Now, you'll be able to apply that knowledge to design your very own product.

**MATERIALS  
EXPLORERS™**

**MATERIALS THAT MOVE US:  
COLLECTION AND GRAPHING**



of the scientific method and then a graph to reveal trends in the data. You'll be able to draw conclusions about the relationship between two variables and explain the advantages of using composites in a variety of applications.

**MATERIALS  
EXPLORERS™**

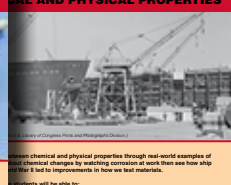
**MATERIALS THAT MOVE US:  
MEASUREMENT AND SCALE**



of the scientific method and then a graph to reveal trends in the data. You'll be able to draw conclusions about the relationship between two variables and explain the advantages of using composites in a variety of applications.

**MATERIALS  
EXPLORERS™**

**MATERIALS THAT MOVE US:  
CHEMICAL AND PHYSICAL PROPERTIES**



of the scientific method and then a graph to reveal trends in the data. You'll be able to draw conclusions about the relationship between two variables and explain the advantages of using composites in a variety of applications.

**MATERIALS  
EXPLORERS™**

**MATERIALS THAT MOVE US:  
STATES OF MATTER**



of the scientific method and then a graph to reveal trends in the data. You'll be able to draw conclusions about the relationship between two variables and explain the advantages of using composites in a variety of applications.

## A PROGRAM THAT WORKS

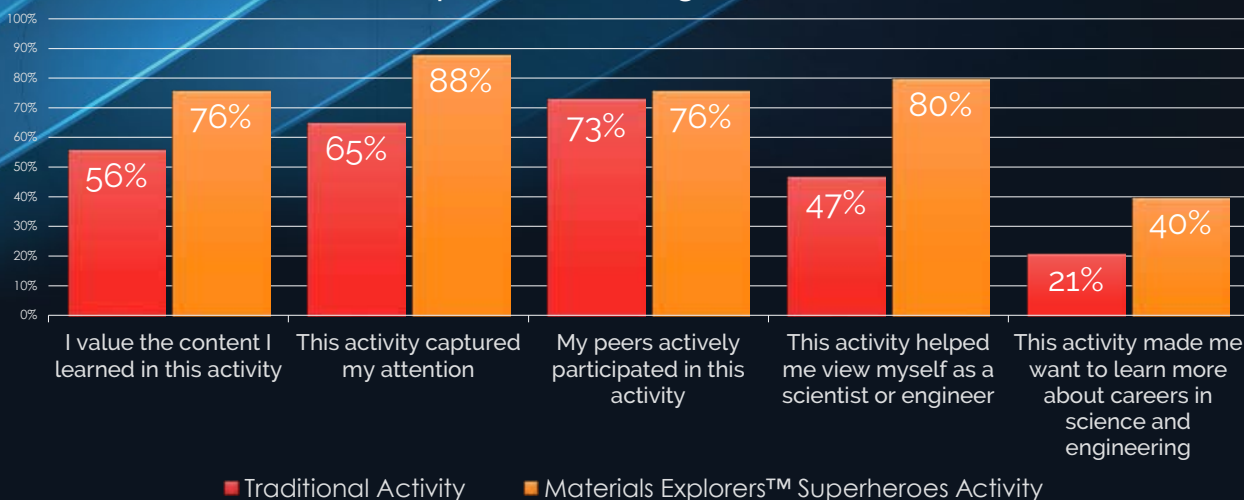
[www.materials-explorers.org](http://www.materials-explorers.org)

*Materials Explorers™* is a collection of free STEM resources developed as a collaborative effort among scientists, engineers, and educators and tested across a variety of classroom settings.

Activities are designed to make STEM feel relevant to students by connecting abstract concepts with **real-world applications and pop culture references**.

### CASE STUDY: SCIENCE OF THE SUPERHEROES

#### Impact on Learning Outcomes



Developed By:



With Support From:



ARCONIC  
FOUNDATION