



Module: Introduction to Material Science
Focus: *The Field of Material Science*
Duration: 1 or 2-43 minute periods



- Objectives:**
1. Students will be able to define the term “materials.”
 2. Students will be able to list and describe the four aspects of Material Science.
 3. Students will be introduced to the role material scientists play in the changing and manipulating materials.
 4. Students will be introduced to the field of material research.
 5. Students will be introduced to the various branches in the field of Material Science.
 6. Students will be able to illustrate the history and development of Material Science.
 7. Students will develop a working understanding of the use of materials in our daily lives.

Materials: Various objects (a metal, a plastic, glass or another ceramic, concrete or another composite and a transistor or any other semiconductor)

- Procedures:**
1. Introduce and discuss the term “material.”
 2. Students will observe and record various characteristics of sample materials.
 3. Give PowerPoint presentation on Material Science.
 4. Review students’ observations of the sample materials.
 5. Students will complete their “Ideal Material” worksheet.
 6. Review students’ answers.

Assignment: 1. See teacher notes.

Assessment: 1. Laboratory Journal, Classroom Participation, Quizzes & Test.

Contact:

Daniel Steinberg, PhD
Director of Education and Outreach
Princeton University Center for Complex Materials/PRISM
316 Bowen Hall,
70 Prospect Ave., Princeton University
Princeton, NJ 08540
609-258-5598
dsteinbe@princeton.edu



Module: Introduction to Material Science
Focus: *The Field of Material Science*
Duration: 1 or 2-43 minute periods



Teacher Notes:

For an easy definition of materials to give to the students is to say that materials are the “stuff” things are made up of. Thanks to the advances in magnification now possible with Scanning Electron Microscopes (SEM) and Atomic Force Microscopes (AFM), scientist can now better understand what happens inside a material. Students in PUMA have an opportunity to be introduced to the SEM and AFM first hand. Since most high schools do not have access to these machines, a possible homework assignment is to research either or both of these types of electron microscopes.

Pass out to the class various materials and have each student record as many characteristics of each as they can. Give as few guidelines as possible as what they are to record.

When the class has completed their observations, give the Material Science PowerPoint presentation. Students are to take notes on the presentation.

Now knowing the basic characteristics of each of the five different types of materials, review with the class their observations of each type of material. You can review in the same order the materials were covered in the presentation, using the presentation slides as a model when discussing each material.

If time permits, have students complete the “Ideal Material” worksheet in class or give as an assignment to complete outside of class. To help students get started, use the example that in medicine, we are always looking for the ideal medicine, a prescription that has very few if any side effects while healing the body as many ways as possible.

Contact:

Daniel Steinberg, PhD
Director of Education and Outreach
Princeton University Center for Complex Materials/PRISM
316 Bowen Hall,
70 Prospect Ave., Princeton University
Princeton, NJ 08540
609-258-5598
dsteinbe@princeton.edu