

The Impact of Materials on Society

Module 11 – Plastics – Outline of Instruction for Faculty

This module focuses on plastics, a ubiquitous material on the consumer market. Belonging to the class of materials known as *polymers*, plastics were the first materials synthesized from other materials/chemicals. Because of their range of properties including flexibility, their relatively low processing temperatures and their low cost polymers filled a critical need in the materials that have impacted society. During this module, students focus on the story of Tupperware products and American advertising history, considering how plastics can acquire social meanings that shape the ways we use and promote this material. In the postwar period, Earl Tupper brought a new kind of polyethylene product to the U.S. consumer market. Students will brainstorm strategies for marketing polymer-based bicycle helmets today, taking into account our global economy.

Module Objectives

Students will:

- identify the properties of polymers
- identify the properties of biopolymers
- discover the uses and applications of polymers both historically and in the future
- examine the way that individual and social perceptions shape the use of a material
- discover how the properties of a material rely on the interests of their users

Student Reading Assignment before Day 1

Read excerpt (pp. 215-237) from

Sass, Stephen L. (1998/2011) *The Substance of Civilization*. New York: Arcade Publishing.

Day 1 Class – Material Science & Engineering Lecture on Plastics

Material Science Professor presents background on Plastics. This lecture will discuss the class of materials we call polymers including a review of their properties, how they were discovered, some of their history.

Materials Science Lessons

A review of the types of polymers including thermoplastics and thermosets, how they are made and finally their applications and challenges.

Day 1 Lecture Development Resources:

1. **Lecture:** [Plastics](#) (PPT)
2. **Sample Lecture Video:** [Plastics and Polymers](#) (22:00) ([Transcript](#))
Excerpts from Kevin Jones' lecture
3. **Demo Video:** [Stretching Polymers](#) (1:17)
4. **Demo Video:** [Making Nylon](#) (2:58)

Classroom Demo: Use a solution of Adipoly Chloride and Hexamethylene Diamine to synthesize nylon in an interfacial polymerization.

Student Reading and Viewing Assignment before Day 2

1. **Read:** [Fantastic Plastics in Postwar America: Earl Tupper, Brownie Wise, and Materials Marketing](#) – by Marsha Bryant

Abstract: The word plastic bears positive and negative meanings that complicate our relationship with this versatile material. The story of Tupperware products' invention, distribution, and marketing offers a case study of how materials acquire meanings that shape the ways we publicize and use them. Merging form and function into a beautiful utility, the Tupperware bowl became an enduring museum object as well as a household icon.

2. **Read Article:** Fromson, Daniel (2011) "[In the Shadow of Tupperware: Earl Tupper's Other Innovations.](#)" *Atlantic*, July 28, 2011
(This short piece has a wonderful slideshow of Tupper's designs from the Smithsonian.)
3. **Read Book:** Clark, Alison J. (1999) *Tupperware: The Promise of Plastic in 1950s America* (Chapter 1). Washington, D.C.: Smithsonian Institution Press. (pp. 8-35)
4. **Read Article:** Sivulka, Juliann *Soap, Sex and Cigarettes: A Cultural History of American Advertising*. Belmont, CA: Wadsworth (1998) 264-270, 275-286. Print.
5. **Watch** two short Tupperware ads on YouTube
 - [Vintage](#) (1:20)
 - [Contemporary](#) (3:48)
5. **Explore** the [Museum of Modern Art website](#), enter 'Tupperware' in Search box (in the bottom-right corner of the page). Follow the links, and consider how your perspective of plastics changes when you view Tupperware products as museum objects.

Day 2 Class – Lecture on Fantastic Plastics

Guest Professor presents Fantastic Plastics in Postwar America: Earl Tupper, Brownie Wise, and Materials Marketing.

Social Lesson:

Social and cultural systems such as language, gender, aesthetics, home design, and advertising shape the ways we perceive the intrinsic physical properties of materials.

Day 2 Lecture Development Resources:

1. **Lecture:** [Fantastic Plastic in Postwar America](#) (PPT) slides by Prof. Marsha Bryant (UF)
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Student Video and Homework Assignment before Day 3

1. **Video:** [Sports: Helmet Design](#) (11:28) by Nikhil Gupta
2. **Video:** [Polymers video](#) (11:31) ([Transcript](#))
3. **Video:** ["Smart Saver"](#) advertisement (2:51) from Tupperware India

After you watch these, answer the following questions:

- a. From the IMOS Helmet Design video (#1), what are the main objectives in designing cycling helmets? (think about the functionality of the helmet, but also the societal needs to improve sports safety)
- b. From the IMOS Helmet Design video (#1), what properties of polymers make them a good material for helmet applications?
- c. From the IMOS Plastics video (#2) what might be an advantage of using biopolymers in Helmets?
- d. From the Tupperware ad (#3), think about what properties of polymers make them attractive to potential customers. What are the specific selling points in this Tupperware ad?
- e. Finally, think about how you might design selling points to pitch a bio polymer-based bicycle helmet to different demographic audiences. How can you draw on strategies from the Tupperware product advertisements to sell your product?

Please answer each question in either bullet points or full sentences. Your full response will probably take 1 ½ to 2 pages. Assignment will be graded out of 2 points on effort, use of the lecture, video, and reading materials, and thoughtful reflection. Be sure your name is on the paper. A cover page is not necessary. We'll build on your responses with the in-class group activity on Day 3.

Assignment: [Module 11 – Individual Homework Assignment](#) (WORD)

Polymers Homework due start of class Day 3.

Your grade will be determined from the following criteria.

Grading Rubric.

2= Responses are appropriate, thoughtful, and indicate engagement with the video and any other required viewing/reading materials. Grammar, sentence structure and punctuation are correct.

1= Responses and arguments are incomplete and/or inconsistent with the required viewing/reading material. Some issues with grammar, punctuation and or sentence structure.

0= Responses are not appropriate to the assignment or missing entirely. Major issues with grammar, punctuation and or sentence structure

Points = 2

Day 3 Class: Flipped Classroom Activity on Polymers and Advertising

Day 3 Classroom Activity: Polymers

Key Concepts: Social and cultural systems such as language, gender, aesthetics, home design, and advertising shapes the ways we perceive the intrinsic physical properties of materials.

ASSIGNMENT: Groups will act as Ad Agencies to propose a campaign for pitching bicycle helmets to a target demographic. The group proposals must highlight polymer's properties and selling points. Students will draw from the successful Tupperware Brands campaign and classic American advertising strategies to create their contemporary approach to selling bicycle helmets. **Each group will focus on 1 target demographic:**

Groups 1-7: Decision makers for a bicycle safety program in elementary schools

Groups 8-14: Athletes—can be male, female, or both (think of an ad that would appear in *Cycle World, Road Bike Action, Triathlete, Runner's World, or another sports & fitness magazine*)

Groups 15-21: Mothers between the ages of 25-35

Groups 22-28: Buyers for big-box stores such as Dick's Sporting Goods

Groups 29-35: BMX teen boys

Bullet Point List 1: *What properties of polymers make them potentially attractive to consumers? (5-7 sentences)* NOTE: Four Ads are provided on the In-Class Activity worksheet for Bullet Point List 1. The instructor may opt to discuss one ad with the whole class.

Bullet Point List 2: *How would your group pitch a polymer-based bicycle helmet to your target demographic? (Thumbnail 3 specific selling points for your ad campaign, from most to least important.)*

***Paragraph:** *How would your group pitch a polymer-based bicycle helmet to your target demographic? Describe your ad agency's approach to the campaign in a 4-5 sentence paragraph. Include 1 classic American advertising strategy you learned from Bryant's chapter.*

Brand Name/Slogan: *Give a Brand Name for the helmet, and a slogan to use in your group's ad campaign (just a phrase or single sentence for the slogan).*

***About Paragraphs:** Think of your individual paragraphs as *micro-essays* that answer the question with *specific* examples. Your first sentence will be a *claim* that your paragraph will develop or prove. (Some call these opening claims *topic sentences*.) Good claims help you focus and organize paragraphs. The rest of each paragraph will be 5-6 sentences that offer the most relevant details and examples to support your claim.

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- Refer to [Day 3 In-Class Activity: Polymers](#) worksheet for specific instructions.
- Refer to the rubric for grading criteria.

Your grade will be determined from the following criteria.

Grading Rubric.

5= Responses are appropriate and indicate engagement with the preparatory material. Grammar, sentence structure and punctuation are correct.

4= Responses and arguments are not as clearly presented. Some minor issues with grammar, punctuation and or sentence structure.

3= Responses are not appropriate to the assignment and do not reinforce the physical and cultural properties of materials. Mistakes in grammar, punctuation and or sentence structure.

2= Responses are incomplete. Major problems with grammar, punctuation and or sentence structure.

1= Responses are inconsistent with material covered in class, videos, and readings. Missing elements of assignment. Poor grammar, punctuation and or sentence structure.

Day 3 Lecture Development Resources:

1. **In-Class Activity:** [Day 3 In-Class Activity: Polymers handout](#) (WORD)

Complete Impact Paradigm Assignment:

Thinking about the material that we covered in this week's unit, add another question to the impact paradigm.

- **Assignment:** [Module 11—Impact Paradigm Individual Homework Assignment](#) (Word)

Additional Resources:

Online Course Module

- View the online Module 11 in [Word](#) or [PDF](#) format
- Available soon: The full online course to upload to your Learning Management System. Contact Kevin Jones at kjones@eng.ufl.edu or Pamela Hupp at hupp@mrs.org for more information.

Articles and Books:

- Clark, Alison J. *Tupperware: The Promise of Plastic in 1950s America* Washington, D.C.: Smithsonian Institution Press (1999).
 - Chapter 1 is on Earl Tupper: "To Be a Better Social Friend: Designing for a Moral Economy"
- Fromson, Daniel (2011) "[In the Shadow of Tupperware: Earl Tupper's Other Innovations.](#)" Atlantic July 28 2011. Web
- Sivulka, Juliann *Soap, Sex and Cigarettes: A Cultural History of American Advertising*. Belmont, CA: Wadsworth (1998) 264-270, 275-286.

- From “The Postwar Boom” section on 1945-60: “New Ways of Selling”, Four Creative Philosophies: “Rosser Reeves: The Hard Sell”; “Leo Burnett – ‘Inherent Drama’”; “David Ogilvy: Image and Science”; “Bill Bernbach – The ‘New’ Advertising.”

Videos:

- Nikhik Gupta. [Sports: Helmet Design](#) (11:28) video
- Megan Robertson. [Improving Environmental Quality – Polymers from Renewable Resources](#) (35:48) video