

# Plastics made from Plants Competing for Shelf Space

A resource for using QUEST Nebraska video in the classroom; created by PBS/NPR partner station NET

## QUEST SUBJECTS

- Life Science**
  - Biology
  - Health
  - Environment
- Earth Science**
  - Geology
  - Climate
  - Weather
  - Astronomy
- Physical Science**
  - Physics
  - Chemistry
  - Engineering

## NE SCIENCE STANDARDS

**Grade 6-8**  
*Physical Science*  
 SC8.2.1 Students will identify and describe the particular nature of matter including physical and chemical interactions

**Grade 9-12**  
*Physical Science*  
 SC12.2.1 Students will investigate and describe matter in terms of its structure, composition and conservation

**Grade 6-8**  
*Earth and Space*  
 SC8.4.2h Students will classify Earth materials as renewable or nonrenewable

**Grade 9-12**  
*Earth and Space*  
 SC12.4.3c Compare and contrast benefits of renewable and nonrenewable energy sources

## PROGRAM NOTES



Recently, companies like Coca-Cola, Pepsi, and Heinz Ketchup have determined that plastic made from plants -- not oil -- makes sense both for the environment and for business. The growing demand has meant a boom in the bioplastic industry. Could this mean the end of the plastic bottle as we know it?

In this segment you'll find...

- ⦿ Information about bioplastics
- ⦿ The growth and development of the bioplastic industry
- ⦿ Compare and contrast bioplastics versus traditional plastics

## TOPIC BACKGROUND

When you drive down just about any stretch of highway in farm country, you see it - miles and miles of corn. For over 100 years, corn has been a staple to Nebraska farmers for uses such as feed for livestock, seed, or for use as food products. However, in the last 20 years, research and development into other uses for corn has greatly expanded.

One recent development is the use of corn for bioplastics. Bioplastics are a form of plastics derived from renewable sources. Corn-based materials like bioplastics and fabrics are a reality today. In fact, they are turning up in more and more places – compostable tableware, food containers, gift cards, snack chip bags, bedding, carpet, shirts and more. All of these products are made from renewable corn and directly replace products made from petroleum. NatureWorks LLC, based in Blair, Nebraska, is one of the companies that makes the raw materials for all these products.

## VOCABULARY

### Research and define

**Bioplastic** – *plastic material made out of living or life-giving elements*

**Renewable resource** - *a resource that can be replenished or renewed in nature over time*

**Non-renewable resource** – *a resource that cannot be produced naturally once it is consumed*

**Biodegradable** – *can be broken down, especially by bacteria*

**Plastic Resin** – *a plastic of vegetable origin that is insoluble in water*

## PRE-VIEWING

- What do you already know about products being made out of non-traditional materials?
- Do you own anything made from bioplastics? How does it compare with “traditional” plastics?

## VIEWING FOCUS

NOTE: You may choose to listen to the radio segment twice with your students: once to elicit emotional responses and get an overview of the topic and again to focus on facts and draw out opinions.

Questions:

- What is a renewable resource? What is a non-renewable resource?
- In what ways could creating products from corn affect you personally?
- How could this affect our planet positively? Negatively?
- From the segment, list as many materials you can remember that are currently made from corn.

### Dig Deeper:

- **Draw and Diagram the chemical formula and atomic structure for traditional plastic, such as is used for plastic soda bottles.**
  - Use an atomic model set and create the molecular chain
- **Draw and Diagram the atomic structure of corn-based bio-plastic, for example the plastic resin made by Natureworks.**
- **Compare these two:**
  - If each is left outside, how would they break down? What chemicals would be given off of each?

For all media see:

- Segment Summary Student Sheet  
[http://www.kqed.org/quest/downloads/QUEST\\_SegSum\\_StudentSheet.pdf](http://www.kqed.org/quest/downloads/QUEST_SegSum_StudentSheet.pdf)
- Personal Response Student Sheet  
[http://www.kqed.org/quest/downloads/QUEST\\_PersResp\\_StudentSheet.pdf](http://www.kqed.org/quest/downloads/QUEST_PersResp_StudentSheet.pdf)

## LESSON PLANS and RESOURCES from NET, QUEST, PBS and NPR

### Recyclable Materials

<http://www.csmonitor.com/Business/Latest-News-Wires/2011/0224/SunChips-bag-Still-green.-Now-quieter>

Remember the chips bag made of recyclable plastic? Research what all the “noise” was about.

### Biodegradable plastics

<http://abcnews.go.com/GMA/video/bio-plastic-bottles-made-potatoes-corn-biodegradable-eco-friendly-environment-13458708>

## VISIT OUR PARTNERS

### Nebraska Department of Education

[www.education.ne.gov](http://www.education.ne.gov)

### Omaha Public Schools

[www.ops.org](http://www.ops.org)

### Lincoln Public Schools

[www.lps.org](http://www.lps.org)

### Nebraska Academy of Sciences

[www.neacadsci.org](http://www.neacadsci.org)

### Nebraska Association of Teachers of Science

[www.neacadsci.org/nats/index.htm](http://www.neacadsci.org/nats/index.htm)

### Omaha's Henry Doorly Zoo

[www.omahazoo.com](http://www.omahazoo.com)

### University of Nebraska State Museum

[www-museum.unl.edu](http://www-museum.unl.edu)

### Boys/Girls Clubs of the Midlands

[www.bgcomaha.org](http://www.bgcomaha.org)

### Girls Inc. of Omaha

[www.girlsincomaha.org](http://www.girlsincomaha.org)

## MORE EDUCATIONAL RESOURCES FOR USING QUEST MULTIMEDIA TO ENHANCE 21<sup>st</sup> CENTURY SKILLS IN TEACHING AND LEARNING

### Why Use Multimedia in Science Education?

<http://www.kqed.org/quest/downloads/QUESTWhyMedia.pdf>

- Read about the importance of using multimedia in the 21st century science classroom.

### How to Use Science Media for Teaching and Learning

<http://www.kqed.org/quest/downloads/QUESTMediaTips.pdf>

- A collection of tips, activities and handouts to actively engage students with multimedia.

### Science Multimedia Analysis

<http://www.kqed.org/quest/downloads/QUESTMediaAnalysis.pdf>

- Give your students the tools to recognize the purposes and messages of science multimedia.

### Create Online Science Hikes with Google Maps

[http://www.kqed.org/quest/files/download/52/QUEST\\_ExplorationCreation.pdf](http://www.kqed.org/quest/files/download/52/QUEST_ExplorationCreation.pdf)

- Do you like the science hike Explorations on the QUEST site? Use this place-based educational guide to create similar science-based maps with youth.

### Media-Making Toolkit for Science Education

<http://www.kqed.org/quest/education>

- Are you interested in integrating media making into your classroom or science education program? Find instructions, worksheets and rubrics for implementing simple media-making projects with students.

## MORE QUEST



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[www.kqed.org/quest](http://www.kqed.org/quest)

This Educator Guide was created by QUEST Hub, a PBS/NPR partner station. To learn more about this partnership, please visit [kqed.org/quest/station/partner](http://kqed.org/quest/station/partner).

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