

Green at Home

Objective:

Investigate the emerging bioproducts industry in your home and community.

Keywords:

- Bioproducts
- Biopreferred
- Biodegradable
- Green

21st Century Skills Represented:

- Environmental Literacy
- Economic & Business Literacy
- Civic Literacy
- Critical Thinking & Problem Solving
- Communication
- Information Literacy
- Media Literacy

National Science Education Standards:

- Earth & Space Science: Earth & Human Activity
- Engineering, Technology & Applications of Science: Engineering Design; Links Among Engineering, Technology, Science & Society

feedstocks	processes	uses
Crop - oil from soybeans	Chemical conversion	Lubricants, plastics, adhesives, paints/coatings, detergents/solvents, pigments/ink

Background

What are bioproducts? Do they work? What are their performance characteristics and the environmental benefits?

Across the nation and around the world, companies are now offering thousands of biobased products, ranging from lubricants and cleaning supplies to carpet backing and energy efficient roofing materials made with ingredients grown on the farm. While farmers offer an abundant and renewable supply of ingredients for food and livestock feed, they also make it possible for companies to use feedstocks, which reduce the petroleum content in commercial and industrial products. Bioproducts are materials, chemicals or energy derived from renewable biological resources.

While it is important to learn what goes into the products we use and where to find bio-based alternatives, consumers want products that will perform and are cost comparable. In the case of lubricants, the product needs to out-perform when it comes to lubricity, friction and rust inhibition. Develop a test to see for yourself. Even small choices can make a real impact today and for years to come.

Materials

Per pair or small group of students:

- Computer with internet connection
- Varying samples of bioproducts and petroleum-based equivalents to each bioproduct (see *Resources* section for online bioproduct catalogs)

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Pre-Lab Preparation

Hold a class discussion on the following questions:

1. What is a biobased product or bioproduct?
2. What makes something a bioproduct?
3. What environmental benefits might come from using bioproducts?
4. Can you think of any bioproducts that might be used around the home?

Lab Procedures

1. Have students go to soyinside.org and click on the bioproducts house. Each of the soybeans represents a soybean-based bioproduct.
2. Have students investigate each of the products. In their notebooks have students categorize the bioproducts into the following categories: furniture/furnishings, housewares/cleaning, industrial supplies, office supplies, personal care/toiletries, and outdoor products.
3. In their notebooks have them answer the following questions:
 - a. Do you use any of these biobased products?
 - b. If you do, how do they stack up against petroleum-based products?
4. Break students into groups of two or three.
5. Provide students with several bioproducts that would be found in one's home and their petroleum-based equivalents. Have each group choose one bioproduct to test.
6. Each group should read the claims that the manufacturer makes and design tests that will pit the claims of the biobased product against their equivalent petroleum-based product. Students should record their tests in their notebooks.
7. Help students gather materials to perform their tests. Repeat tests and record results.
8. Considering the results of the tests, rewrite the bioproduct's claim.

Post-Lab Discussion/Questions

1. Have students record their answers to the following questions:
 - a. What were the results of your consumer test?
 - b. What are the factors that could make a product a "bioproduct"? What products are not bioproducts?
 - c. If everyone began to use bioproducts, what might be the impact on the environment?
 - d. What are some of the unintended consequences that might happen as a result of switching to bioproducts?
 - e. Where can you add bioproducts in your life? What choices would you be willing to make?
2. Hold a class discussion over the above questions.

Expansion Ideas

- Research the federal Biopreferred Program. Do you have a similar program in your state? Why establish programs that promote the use of bioproducts?
- Search the store shelves. What examples of bioproducts can you find in these stores? What business/economic decisions might limit the availability of these products?

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Evaluation of Learning

- Students were able to use critical thinking to evaluate product claims and design appropriate tests.
- Students were able to use data to rewrite product claims.
- Students turn in data that reflects repeated testing.

Resources

- Videos
 - [Ohio FFA Camp Sales Finalist 1](#) from YouTube by Ohio BioProducts Innovation Center
 - [Ohio FFA Camp Sales Finalist 2](#) from YouTube by Ohio BioProducts Innovation Center
 - [Cathy Horton, Founder of Nutek, “Go for the Brass Ring”](#) from YouTube
 - [Cathy Horton, Founder of Nutek, “Get Dirty”](#) from YouTube
 - [Cathy Horton, Founder of Nutek, “Solve that Point of Pain”](#) from YouTube
 - [Cathy Horton, Founder of Nutek, “Move Fast to the Market”](#) from YouTube
- Websites and Articles
 - [From the Earth – Bioproducts](#) by Ohio Corn Marketing Program and Ohio Small Grains Marketing Program
 - [Why Bioproducts?](#) by Ohio Soybean Council
 - [BioPreferred Program](#) by United States Department of Agriculture
 - [Beyond the Bean: New Uses](#) by United Soybean Board
 - [Ohio manufacturers to gain from broader ‘biopreferred’ labels](#) by Dayton Business Journal
 - [BioPreferred Procurement Executive Order](#) by Ohio BioProducts Innovation Center

Contacts

- Nutek Green, Cleveland, OH: <http://www.nutekformulations.com/>
- Northwest Ohio Green Products Center, Toledo, OH: <http://www.nwohiogreenproducts.org/>
 - Ohio Green Product Company Locator: <http://www.nwohiogreenproducts.org/gpco/gpco-ohio.php>
- Ohio Corn and Wheat Growers Association, Delaware, OH: <http://ohiocornandwheat.org/>
- Ohio Soybean Council, Columbus, OH: <http://soyohio.org>