

Performance Matters: Bioproducts vs. Traditional Cleaning Products

Objective:

Evaluate and compare the performance of bioproducts and traditional cleaning products using scientific methods.

Keywords:

- Bioproduct
- Green products
- Scientific Method

21st Century Skills Represented:

- Environmental Literacy
- Economic, Business & Entrepreneurial Literacy
- Critical Thinking & Problem Solving
- Communication & Collaboration
- Information Literacy
- Media Literacy

National Science Education Standards:

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

feedstocks

Crop – oil from soybeans

processes

Chemical conversion

uses

Detergents/solvents/soaps

Background

If consumers make the right choices, bioproducts have the potential to replace petroleum-based materials with renewable, environmentally-friendly products and resources. If every household in the U.S. replaced a single box of 48 oz. powdered laundry detergent with a bioproduct alternative, we would save 96,000 barrels of oil per year – enough to heat and cool well over 5,000 homes.

So, what are the benefits of bioproducts? And, why should people buy them?

There are many reasons used to promote bioproducts. Switching to bioproducts will help reduce our dependence on petroleum-based materials. Increased use of compostable materials will help reduce overuse of landfills. Use of bioproducts is often better for our health and the environment.

Bioproducts are composed wholly or significantly of biological ingredients - renewable plant, animal, marine or forestry materials. Soybeans alone account for an increasing number of bioproducts, and today you will find soy-based bioproducts in everything from ink toner, paint and cleaning products to carpet, insulation and seat foam.

But performance matters. Studies have shown that the public is willing to purchase and use bioproducts only if they are competitive in price and performance. What can you discover about the performance of the many new bioproducts on the market?

Materials

Per group of 2-3 students:

- Nutek Green Carpet carpet cleaner and commercial foam carpet cleaner
- Carpet square
- Nutek Grime-Off grease buster and commercial grease removers for home use
- Tile square
- AND
- Various elements to dirty carpet and tile (juice, dirt, grass, crayons, grease)

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Pre-Lab Preparation

1. Review the scientific method with your students.
2. Hold a class discussion on the following questions:
 - a. What is a bioproduct?
 - b. What is a green product?
 - c. What are some examples of bioproducts and green products?

Lab Procedures

1. Break students into groups of two or three.
2. Provide each group with a carpet square and tile.
3. Have each group dirty their carpet square and tile.
4. Have the groups develop experiments to test the effectiveness of both the traditional cleaners and bioproduct cleaners.
 - a. Students must develop a step-by-step plan of action using the scientific method.
 - b. Students should record data throughout and prepare graphs or charts to illustrate results.
5. All groups should present their experimental procedures, conclusions, and possible next steps to the class.
6. A composite of results or class graph can be generated to compare all groups' results.

Post-Lab Discussion/Question

1. Have students record their answers to the following questions:
 - a. Did the bioproducts work better than the traditional cleaners? Why do you think it did or did not?
 - b. Was there a large difference in the performance of the bioproduct and traditional cleaner? Why do you think there was or was not a large difference?
 - c. Is it beneficial for someone to buy the bioproduct over the traditional cleaner? Why or why not?
2. Hold a class discussion over the above questions.

Expansion Ideas

- Create a testing form that can be used to expand the testing process.
- Test other bioproducts/green products (e.g. Nutek Bolt Off versus Liquid Wrench; see *Resources* below for additional items).
- Compare bioproduct to bioproduct-competing brands, including a cost analysis.
- Develop a business or marketing plan (see *Ohio FFA Camp Sales* videos in the *Resources* section).
- Examine labels of products to test and compare ingredients, claims, etc.

Evaluation of Learning

- Evaluate the step-by-step procedures presented to the class.
- Students will turn in their procedures, results, observations, and answers to all questions.

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Resources

- Videos
 - [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
 - [Ohio FFA Camp Sales Finalist 1](#) from YouTube by OBIC
 - [Ohio FFA Camp Sales Finalist 2](#) from YouTube by OBIC
- 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

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 Soybean Council, Columbus, OH: <http://soyohio.org>