



Green Science Policy Institute

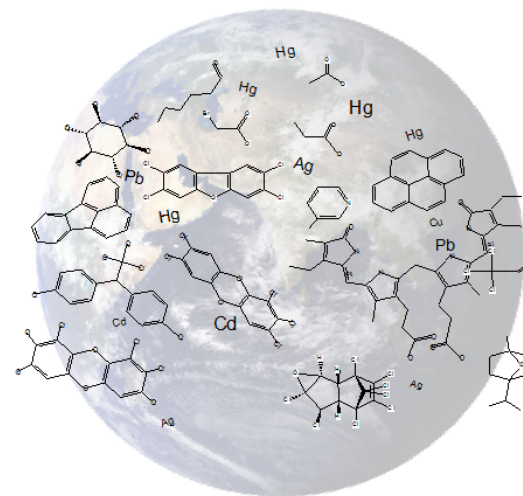
Healthier Furniture: Chemical Classes of Concern

Arlene Blum PhD

Green Science Policy Institute

www.GreenSciencePolicy.org

A Planetary Boundary for Chemical Pollution



Chemical pollution is global:

- Rapidly increasing global production
- Persistence and long range transport
- Finite capacity of the earth to absorb toxics

A globally coordinated response is needed

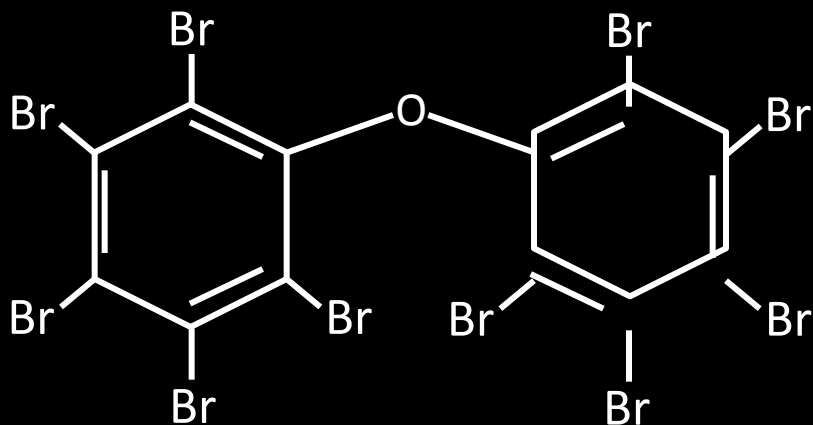
Diamond et al, 2015, Environment International

U.S. Toxic Substances Control Act (1976)

- 62,000 previous chemicals “grandfathered”
- 20,000 new chemicals
 - 85% have no health data
 - 67% have no data at all



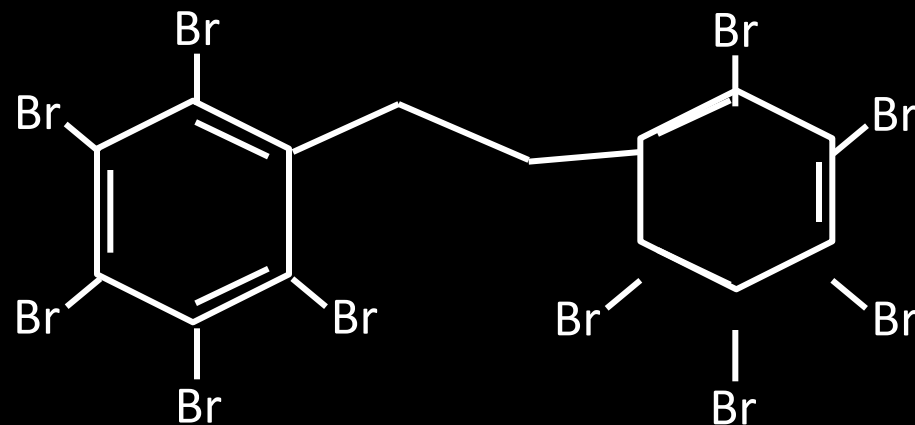
Problem: Regrettable Substitution



Decabromodiphenyl
ether

Concerns:

- Persistence
- Bioaccumulation
- Toxicity



Decabromodiphenyl
ethane

Concerns:

- Persistence
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Problem: Human Toxicological Trial?

“We are conducting a massive clinical toxicological trial, and our children and our children's children are the experimental subjects.”

-Herbert Needleman & Philip Landrigan

A Solution: The Six Classes

1. **Highly fluorinated chemicals (PFAS)**
stain and water repellants
2. **Chlorinated antimicrobials**
triclosan and triclocarban
3. **Flame retardants**
brominated, chlorinated, phosphate
4. **Bisphenols and phthalates**
phthalates, BPA, PBS etc.
5. **Organic solvents**
benzene, methylene chloride, xylene, etc.
6. **Certain metals**
lead, mercury, chromium, cadmium, arsenic,

Is it necessary?

Is it worth it?

Is there a safer alternative?



s i x c l a s s e s . o r g

SixClasses.org

15-minute webinars on Six Classes
containing chemicals of concern

Buyer's Club



- Require transparency from manufacturers
- Utilize collective purchasing power to create a demand for healthy products and materials

Harvard also plans a Buyer's Club



Targeting Harmful Chemicals on Campus



HARVARD
UNIVERSITY

Sustainability

Six Classes

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Class 1: Highly Fluorinated Chemicals

Carbon-Fluorine bond strength:

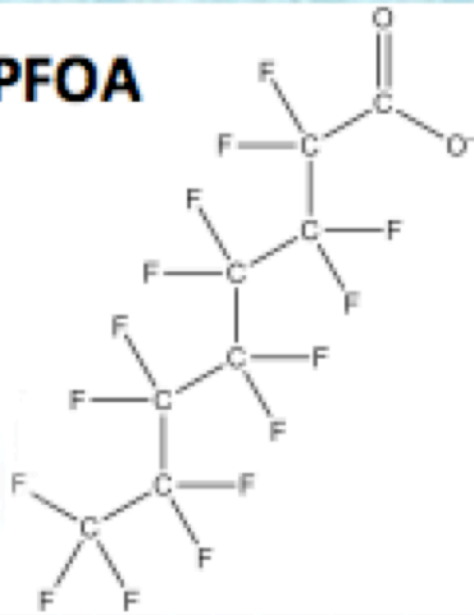
- Leads to oil and water repellency
- Lasts for geologic times!



Highly Fluorinated Chemicals are in:

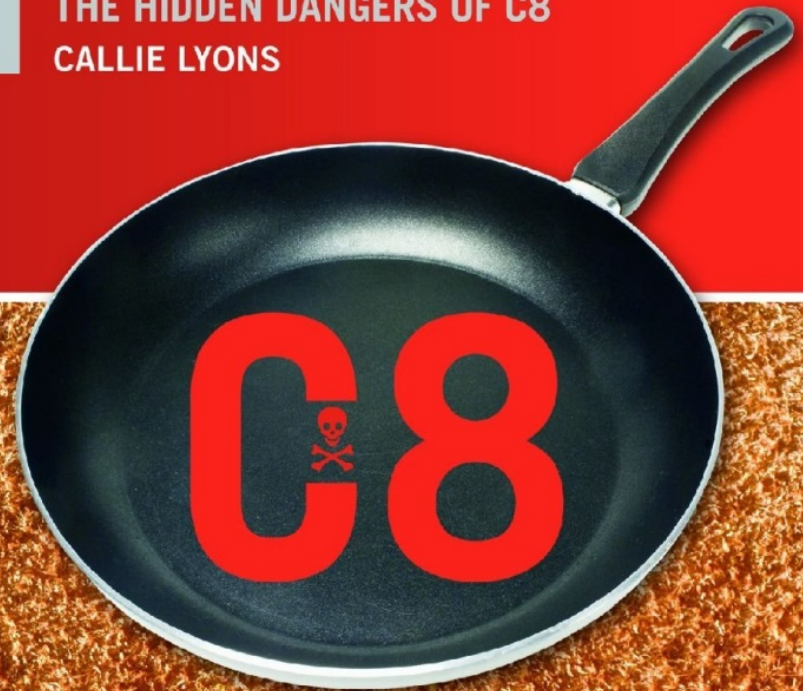


PFOA



**STAIN-RESISTANT,
NONSTICK, WATERPROOF,
AND LETHAL**

THE HIDDEN DANGERS OF C8
CALLIE LYONS



C8 Human Toxicology

- PFOS and PFOA persist in the body for years
- Health effects linked to exposure to PFOA:
 - Kidney and testicular cancer
 - Elevated cholesterol
 - Thyroid disease
 - Delayed puberty, decreased fertility (women) and early menopause
 - Reduced immune response in children

C8 replaced with forty forms of C6



- Persistent, a family trait
- In groundwater, wastewater, & seawater
- Increasing C6 levels in human blood
- Show signs of possible human health harm

The Madrid Statement on Highly Fluorinated Chemicals (PFASs)



flickr @ Marc

Documents the scientific consensus:

- potential for harm
- roadmap to prevent further harm

Signed by 230 scientists from 40 countries

2015: Environmental Health Perspectives

Stories about Non-Stick

HEALTH TOXINS

These 9 Common Products May Contain a Potentially Dangerous Chemical

Sarah Begley @SCBegley | May 1, 2015

PFASs are in goods like pizza boxes and outdoor clothing

Health officials and advocates [called for](#) new research on the group of chemicals known as PFASs (or PFCs) on Friday, raising concerns that the substances could pose health risks.

TIME

The Opinion Pages | OP-ED COLUMNIST

The New York Times

Chemicals in Your Popcorn?

JUNE 4, 2015

What do a pizza box, a polar bear and you have in common?

[All carry a kind of industrial toxicant](#) called poly- and perfluoroalkyl substances, or PFASs, that do two things: They make life convenient, and they also appear to increase the risk of cancer.

Nicholas Kristof

These Chemicals in Pizza Boxes and Carpeting Last Forever

More than 200 scientists around the world document the threats of perfluorinated compounds and call for more government control.

By **Lindsey Konkel**, National Geographic
PUBLISHED MAY 01, 2015



NATIONAL GEOGRAPHIC

Massive Group Of Scientists Thinks You Shouldn't Use Non-Stick

By **Dan Nosowitz** on May 19, 2015

modern farmer



A group of 200 scientists just published what's being called "The Madrid Statement," a wide-ranging criticism of the category of chemicals used to create non-stick, grease-proof and waterproof coatings. Will it get you to stop using non-stick pans?

Brands eliminate fluorinated chemicals



MANGO

As of July 2013



As of August 2014

LINDEX

As of October 2014



As of January 2015

As of January 2013



By July 2015



By July 2015



By December 2015



By December 2015



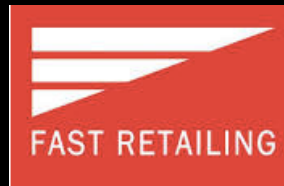
By December 2015



By December 2015



By July 2016



By July 2016



By December 2017



99% PFAS-free by December 2017

Highly Fluorinated Chemicals & Biomonitoring California

In November 2015, the Scientific Guidance Panel for Biomonitoring California recommended adding the entire class of Highly Fluorinated Chemicals (PFASs) to the Program's list of priority chemicals for the Program to biomonitor.



[H](#)



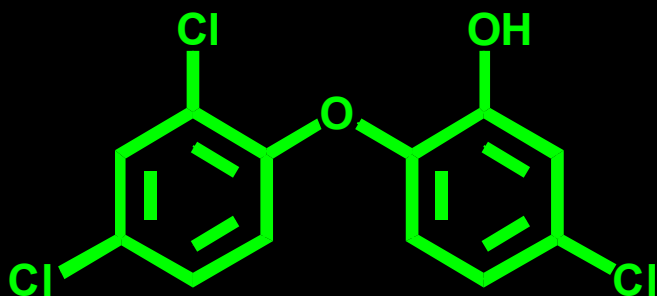
<http://biomonitoring.ca.gov/chemicals/perfluoroalkyl-and-polyfluoroalkyl-substances-pfass>

The Six Classes

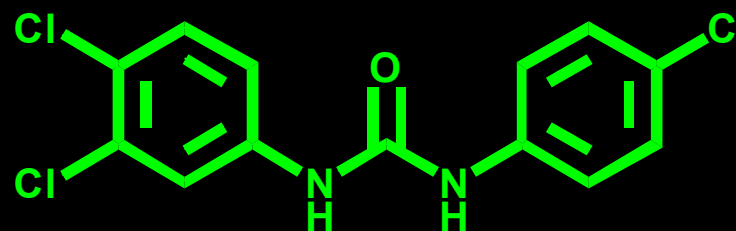
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Class 2: Antimicrobials

Triclosan

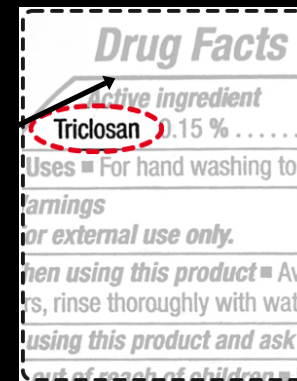


Triclocarban



Where They Are Used

- Disinfectants
- soap, mouthwash, detergent, shampoo
- Deodorant/clothing
- Toothpaste
- Cosmetics
- Kitchen supplies, furniture
- Toys, school supplies, sports equipment



Do We Need Them?

Is there evidence antimicrobials reduce infections?

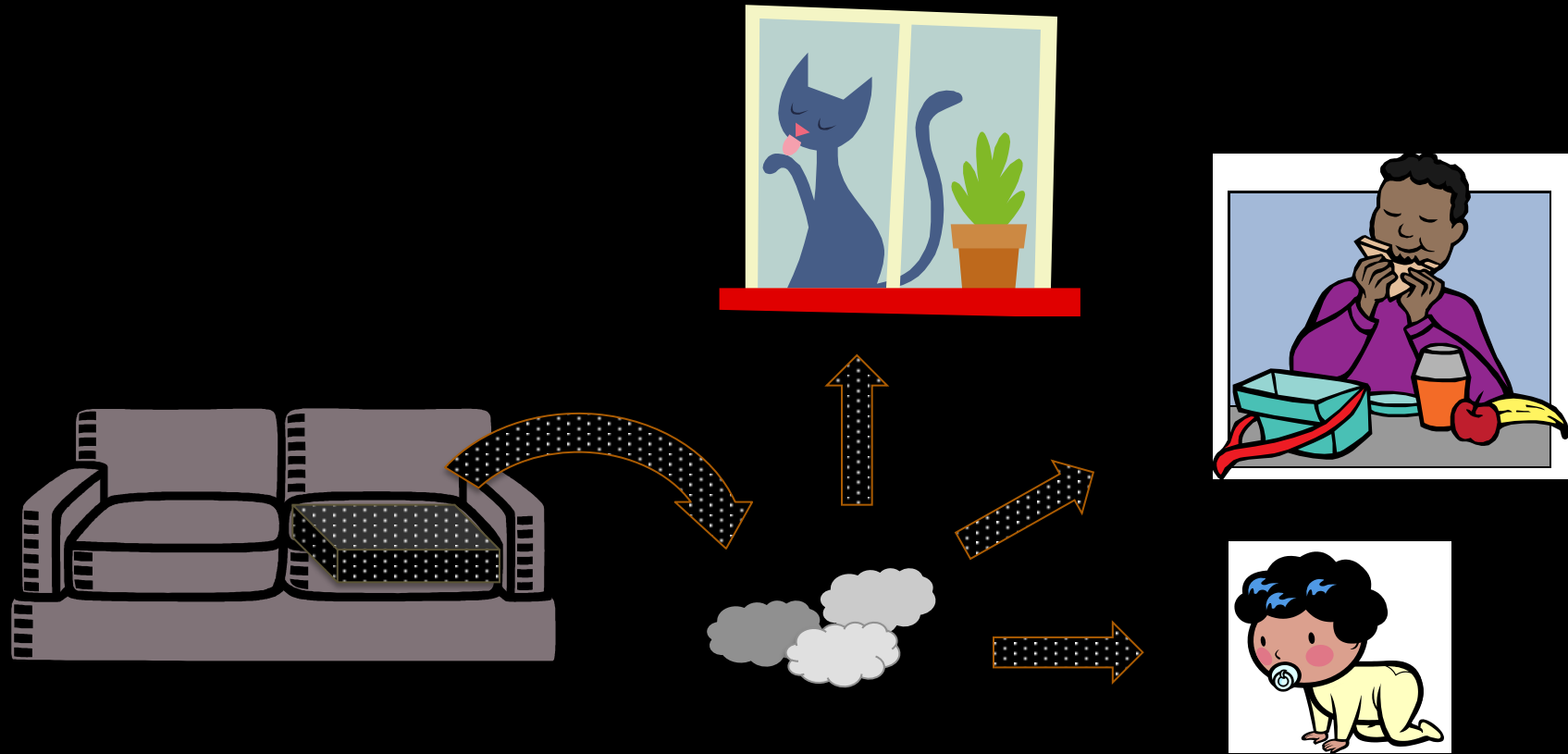
- No proven benefit over soap & water
- Research: Ineffective in flooring and plastic
- In toothpaste?



The Six Classes

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Products to People



Human Health

Higher pentaBDE

associated with

lower birth weight
impaired attention
poorer coordination
lowered IQ

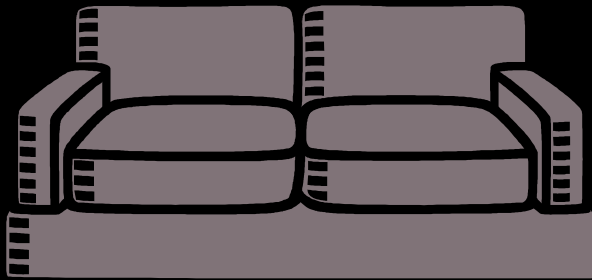


longer time to get pregnant
altered thyroid hormones



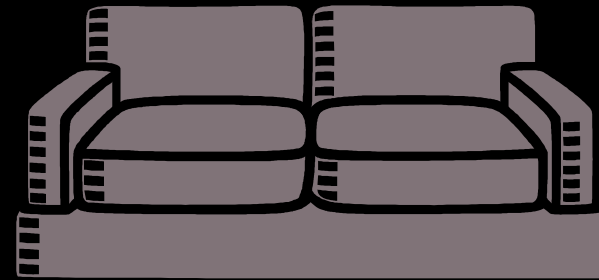
TB117 Fire Safety Benefit?

TB117 foam



~

Non - TB117 foam



“No significant, consistent difference...”



Elimination of Fire Retardant Chemicals in Office Furniture

“Given the increasing body of evidence that indicates the persistence, bio-accumulation and potential health aspects of many fire retardants, we believe the risks associated with the use of these chemicals is greater than the hazard associated with the fire risk from furniture without fire retardants.”

- From the position paper

Business and Institutional Furniture Manufacturer's Association. (BIFMA)

California Flammability Standard TB117-2013

Mandatory January 1, 2015

Flame retardants not needed,
but can still be used

Product Labels Required

NOTICE

THIS ARTICLE MEETS THE FLAMMABILITY REQUIREMENTS OF CALIFORNIA BUREAU OF ELECTRONIC AND APPLIANCE REPAIR, HOME FURNISHINGS AND THERMAL INSULATION TECHNICAL BULLETIN 117-2013. CARE SHOULD BE EXERCISED NEAR OPEN FLAME OR WITH BURNING CIGARETTES.

The upholstery materials in this product:

contain added flame retardant chemicals

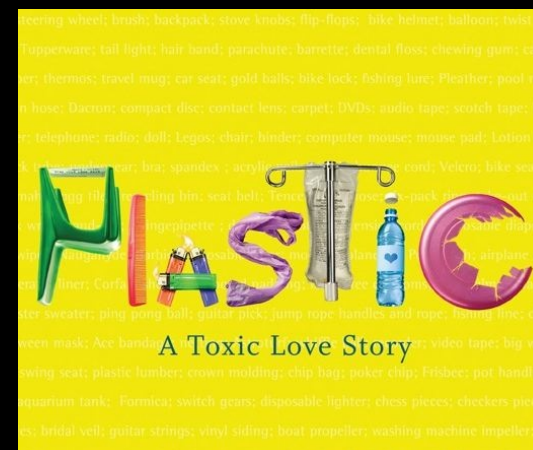
contain NO added flame retardant chemicals

The State of California has updated the flammability standard and determined the fire safety requirements for this product can be met without adding flame retardant chemicals. The State has identified many flame retardant chemicals as being known to, or strongly suspected of, adversely impacting human health or development.

Class 4: Bisphenols and Phthalates

Uses:

- **Bisphenols:** plastics, cash register receipts, adhesives, can linings
- **Phthalates:** plasticizers, lubricants, solvents, emulsifiers, fragrances



http://www.susanfreinkel.com/books_Plastic.html



Class 5: Organic Solvents

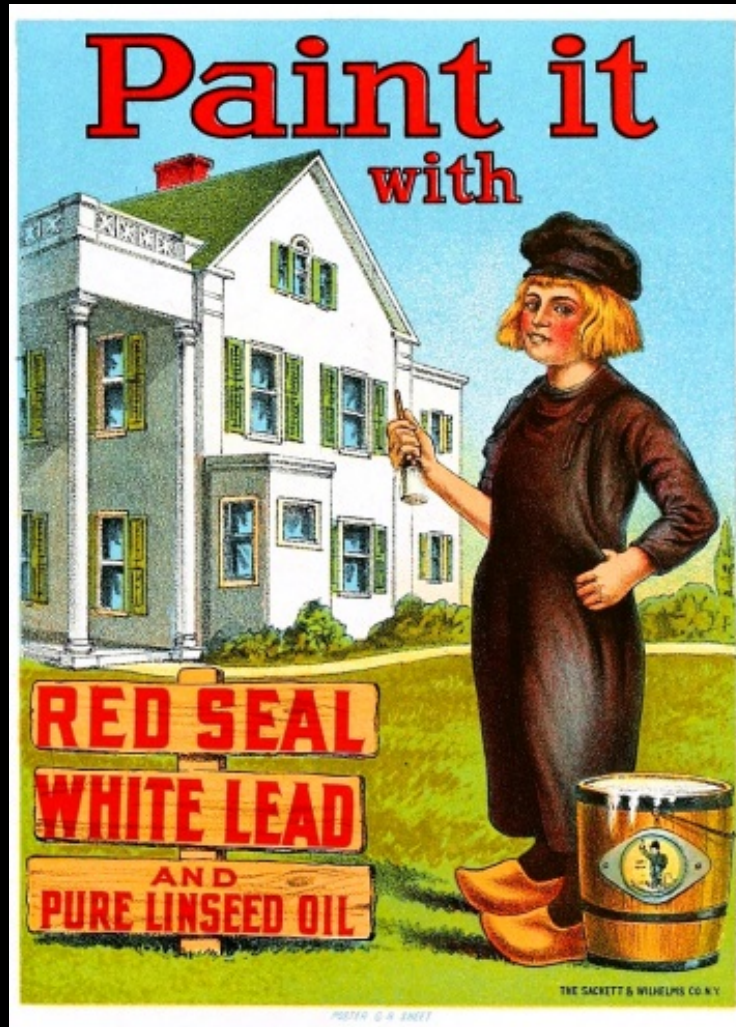
(aliphatic, aromatic, halogenated, oxygenated)

- Hydrocarbon solvents
 - Aliphatic organic solvents (petroleum-based)
 - Aromatic organic solvents (toluene, xylene, benzene)
- Chlorinated solvents
 - E.g., Methylene chloride, perc, TCE
- Oxygenated solvents
 - Acetone, glycol ethers, alcohols



Class 6: Certain Metals

(arsenic, cadmium, chromium, lead, mercury etc.)



Courtesy: Dr. Graham Peaslee

The Six Classes Challenge

Can the use of the Six Classes in
consumer products be
reduced by 50% in five years?

A scenic mountain landscape. In the foreground, a dirt path winds through a field of green grass and vibrant red wildflowers. The middle ground shows rolling green hills and a dense forest of evergreen trees. In the background, a large, snow-capped mountain peak rises above a layer of white clouds. The sky is a clear, bright blue.

By reducing use of Harmful Chemical Classes

We can have a healthier world.

www.GreenSciencePolicy.org